FINAL REPORT

EMERGENCY SERVICES AND

CONTINUING CARE UNDER MEDICAID

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Chapter One

Introduction

Since its inception a major goal of the Medicaid program has been to increase the access of the poor to health care. Prior to Medicaid, the poor made fewer health care visits than higher income classes (Butler & Scotch, 1978), fewer visits for preventive care, and were less likely to have an ongoing professional relationship with an office-based physician.

While the Medicaid program was intended to rectify inequities in the distribution of health care, most studies of health care utilization have been designed in such a way that they do not explicitly examine the utilization by the poor under the Medicaid program. Utilization studies have either gathered data from specific hospitals or interviewed a random sample of household members about their use of health care. Each of these techniques gathers some data on the health care of the poor and compares the poor and non-poor. Unfortunately, these studies have not provided a detailed examination of the care provided through the Medicaid program. Existing data frequently are cross-sectional, examine only one kind of care or look only at visits rather than clients. The need for more detailed information is recognized, and the National Medical Care Utilization and Expenditure Survey, which collected data on subsamples of Medicaid eligibles in four states is one manifestation of that recognition.

Rapid advances in computer technology and the increasing use of computerized information systems has provided a second technique for studying the utilization of Medicaid eligibles. Roghmann (1974) has studied trends in the Rochester, New York Medicaid population, and Berkanovic (1974) examined the potential uses of computerized information systems for health services research. Moreover, as the costs of primary data collection increase, computerized information systems will become an increasingly preferred source of data. Computerized information systems have several strengths:

1. The data base includes information on all services covered by Medicaid so a complete understanding of services and costs can be obtained.
2. The data base is longitudinal.
3. Visits to various providers can be linked to specific clients. This is a major advantage since analyses of utilization by clients, patterns of care, and continuity of care can be undertaken.
4. Since the data base reflects individuals eligible for care:
   a. the proportion of individuals using health care services can be examined. This provides an important context lacking in most utilization studies.
   b. utilization rates and expenditure profiles can be constructed.

Using a computerized information system also has disadvantages, which arise primarily from the researcher's distance from data collection

procedures. The researcher is limited to variables existing in the data base, frequently does not have the ability to verify or edit data, and can not always be assured that all individuals producing the data, in this case health care providers, categorize events in the same way. These difficulties need to be resolved as information systems become a more frequently used data base.

A computerized information system incorporating data on Medicaid clients includes a wealth of information about their utilization of Medicaid clients. The American Academy of Pediatrics, in cooperation with the Suffolk County, New York Medicaid Program has analyzed three years' data from the Suffolk County, New York system about the utilization of health care services by children eligible for Medicaid. Since there are few precedents for using such a rich and complex data base this study should be considered as a pilot study providing practical lessons on the use of such a data source in addition to examining the kinds of questions which can be addressed with such a data base. Most of the methodological issues are discussed in Chapters 2 and 3, although others are considered in connection with relevant substantive questions. Substantively, the report focuses on three major topics related to the utilization of Medicaid-eligible children.

1) What is the utilization experience of Medicaid children? Has it changed over time?

2) Medicaid-eligible children receive most of their care from appropriate sources? What is the pattern of care over time?

3) How much continuity of care is there in the utilization behavior of a Medicaid population? What impact does the client's pattern of ambulatory utilization have on the use of other services, like hospitalization, and on the total cost of care?

Chapter 4 discusses the utilization of services through an examination of the visits made by those children eligible for Medicaid. After discussing utilization at the visit level of analysis, we describe in Chapter 5 the prevalence of use among children eligible for services and which children are more likely to use services. Chapters 6 and 7 discuss the use of two of the main sites of health care for children -- the physician's office and the emergency room. Chapter 6 discusses the prevalence of ER use, how frequently the ER is used, and the effect of ER use on other services. Chapter 7 describes the physician specialties serving Medicaid children, and the frequency with which they see children. In these chapters, it becomes clear that the concept of pattern of care, or the combinations of sites of care used by a Medicaid child, is important for understanding utilization. For example, the data suggest that children rarely rely on the ER by itself and that most also see office-based physicians, as well. Chapter 8 describes patterns of care and their consequences using three different measures of the pattern. The data suggest that users of multiple ambulatory providers have the highest costs. The findings related to pattern of care suggest that a more refined measurement of continuity of care should be undertaken. Chapter 9 examines continuity of care and its effects on utilization and program expenditures. The report concludes with a discussion of implications for policy in Chapter 10.

Before proceeding to present the results of the research, it will be useful to provide some background on the study site, Suffolk County, New York. Suffolk County is located on the eastern end of Long Island,

New York. In addition to having a well established information system, Suffolk County has the additional advantage of being bounded on three sides by water. This limits the migration of clients to other counties for medical services, a problem which Cromwell and Schurman (1981) found in their analysis of Medicaid utilization. Suffolk County had a population of 1,222,700 in 1974, which was slightly younger and had a larger proportion of Whites than either the national as a whole or New York State. Approximately 48 percent of Suffolk County residents were under 25, while 45.9 percent of the nation's and 42.9 percent of New York state's population were under 25. In Suffolk county, 95 percent of the residents are White, while 87.4 percent of the nation's and 86.8 percent of New York state's residents were White. Moreover, even though the county's population of young people was somewhat higher then for the state or the nation, it appears that the proportion of children eligible for Aid to Dependent Children in Suffolk County was somewhat less than in the nation or New York state. The 1975 number of children eligible for ADC per 100,000 population was 3790 in Suffolk County, 5191 nationally, and 6640 in New York State (from the Area Resource File for New York, 1977). Since this information indicates that Suffolk County may not be representative of the country, the study may be seen best as a pilot case study whose major purposes are to identify issues needing further study on a larger scale and to describe the use of medical services and the associated expenditures in a single location. We cannot be sure that the Medicaid population in Suffolk County behaves similarly to Medicaid recipients elsewhere.

Chapter Two

Methodology

This chapter describes 1) the data used in the study, 2) sampling techniques, 3) the units of analysis, and 4) the measurement of key variables.

Date Sources

The study examines data from a Medicaid Claims Information System in Suffolk County, New York. The information system which has been in operation since 1975, is used primarily to process claims for payment by providers, but since it contains data on all eligible clients and all covered services, it is a rich source of data for policy analysis and research.

This study used two files from the Suffolk County Medicaid Information System. The first was the master eligibility file containing data on the one-half million clients who had been eligible for Medicaid at any point since the information system was established. Eligibles are never removed from this file, which contains demographic information about the client during his or her four most recent eligibility periods. Since eligibility periods end when individuals no longer meet the qualifying criteria they can be of varying lengths. For people who had been eligible for Medicaid more than four times, only the most recent four periods were maintained in the eligibility file. Information on the township in which the person lived, or whether he or she was covered

by private insurance and on the type of eligibility was recorded for each of the eligibility periods.

A second file included data on all Medicaid Claims Office claims. This file contains between four to five million claims. Each record in the file represents one claim. Data from billing forms submitted by the provider is entered into the information system. Ten different forms are used for the different types of providers; some information is common to all forms, while other information is specific to an individual form. Appendix 1 summarizes the variables in the system, and the providers to whom they are related.

The Medicaid Information System allows us to differentiate between individuals who are "spending down" to a certain income level and individuals eligible for cash grants. We might expect that the spend-downs use more services since they are eligible due to a medical crisis, but when an eligible family includes more than one user of service, we do not know which member of the family had the critical medical needs that triggered eligibility.

The Suffolk County Medicaid office collected information from their files on the number of parents and siblings at home for a 5 percent random sample of the original sample. Family data on these 729 children were then merged with the other data from the information system. The information system itself, however, does not contain information on the family composition of eligible children.

While Medicaid claims data bases have been used to monitor physician billing and review utilization practices (see, for example, Paris et al., 1980), a few investigators have also analyzed data from other information systems. Roghmann (1974) analyzed utilization patterns of Medicaid children, but found that needed variables such as census tract, were not included in the file. Berkanovic (1974) raised more serious questions about the analysis of claims data. Studying an Oregon information system, he found that demographic data were not edited for accuracy and that data elements were missing in 30 percent of the cases. Berkanovic also noted that diagnosis was not coded in the file and argued that since physicians vary in the way they code services provided in an office visit, it is difficult to determine if data concerning services were uniform and reliable. While recognizing that information systems may differ, he concluded that the information system's utility for epidemiological or utilization studies was limited.

The Suffolk County Medicaid data base has avoided many of the problems Berkanovic cited, but it does contain some of the limitations cited by Roghmann and Berkanovic. Since the data base was edited and welfare offices were requested to supply missing information, missing data is less of a problem in this data base than in previous ones. The item most frequently missing was the village in which the client lived, which was missing for 12.1 percent of the sample. The township, a larger residential unit, was missing for 8.6 percent of the sample. Race and/or sex were missing for 5.6 percent of the sample. Data on insurance coverage and eligibility dates were missing for less than 1 percent of the sample. Thus, geographic analyses were limited because of the missing

data and because the client's address was eliminated from the file as part of the attempt to maintain the confidentiality of the data. However, missing demographic and eligibility data did not represent a serious obstacle to the analysis.

The Suffolk County data base also suffered from some of the limitations Berkanovic mentioned. Diagnosis was not included in the computer file, a serious limitation for utilization analysis since the nature and severity of illness can not be controlled for. Furthermore, it is difficult to verify data beyond the editing done by the Medicaid office. While it is indeed likely that physicians report services in different manners, this is not a serious limitation for our analyses, since we do not examine the specific services provided during a physician encounter. Before such analyses are undertaken, it would be important to discover differences in the ways providers report services.

In sum, the Suffolk County Information System has relatively complete information. The Medicaid office does edit for accuracy and consistency of data and, although further verification by the researcher is impossible, the data can be considered to be reliable indicators of the amount of use by a sample of individuals and relatively reliable indicators of demographic and eligibility characteristics of those individuals. Thus, the data can be used to examine the amount of utilization by Medicaid clients and the patterns of utilization.

Selecting a Sample

At our request, the Suffolk County Medicaid Office produced a file containing eligibility and demographic data on 90,883 clients born in 1959 or later who were eligible for Medicaid at some point

in time between 1977 and 1979. This age range was selected so that, if they met the other criteria, children could be eligible for Medicaid benefits during all three years without becoming 21.

In order to limit the analyses to a manageable population size, a 5 percent sample was drawn in a two-step process. First, a 15 percent random sample was drawn which was split into a 5 percent sample and a 10 percent sample. The 5 percent sample was compared to the 10 percent sample in order to check its representativeness. Since only 1 of the 25 statistical tests which were performed showed significant differences at the .05 level, the 5 percent sample was accepted as random.[1] The Suffolk County Medicaid Office then produced a file containing all 43,600 claims made by the sample of 4525 children during the 1977-1979 study period.

The Medicaid Information System contains data on all children eligible for Medicaid, including children who are wards of the Department of Child Welfare. Eligibility data on the Child Welfare cases is manually updated by Child Welfare workers who often do not notify the Medicaid office when a child is no longer eligible. Thus, Child Welfare cases may have appeared to be eligible in the information system when in reality, they were not able to make claims. The 303 children eligible for Child Welfare in the sample were therefore dropped from the analyses of utilization.

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[1] The 5 percent sample was slightly older than the 10 percent sample.

The subsequent analyses are based on relevant subpopulations of the study. The analysis on the number of clients using services was based on the 3,734 children eligible for at least three months during the study. The chapter on the patterns of care examined the 2911 children making at least three visits to physicians, emergency rooms, and clinics. The chapter on the utilization of office-based physicians analyzed claims made by the 2634 children who saw office-based physicians. Analyses of continuity of care were based on individuals with at least three claims to physicians, emergency rooms, and/or clinics, when using one measure of continuity and on individuals with at least four claims when using another measure of continuity since the measures are considered unreliable for individuals with fewer claims (Roos, 1980). The individual chapters provide more detailed explanations of the sample used in each analysis.

Levels of Analysis

The structure of the Medicaid Information System makes it possible to look at the data at several levels of analysis. First, the visit or claims level can be analyzed where each event is a visit to a specific provider. Most utilization studies have used this unit of analysis to examine the use of specific sites. Demographic and eligibility data were disaggregated and merged with the information for each of the 46,000 claims in the visit-level analysis file.

Shepard and Neutra (1977) describe difficulties with studies which analyzed samples of visits. If individual clients used a facility with differing frequency, the visits made by frequent users were more likely to be included in the sample since they were more prevalent. For

example, an analysis based on a sample of visits to Clinic X would be likely to overrepresent the demographic characteristics or presenting complaints of more frequent users. In this situation, the researcher would be unable to generalize accurately about the characteristics of people using Clinic X since frequent users would be over-represented in the sample. In addition, samples of visits may exaggerate the size of a population using services when some of the clients are frequent users. Shepard and Neutra recommend that either of two steps be taken to avoid this situation: 1) weighting visits by the inverse of the total number of visits the individual made or 2) drawing a sample of clients rather than a sample of visits.

This study avoids the difficulties Shepard and Neutra describe since the data represent a random sample of clients. However, at the visit level, demographic and eligibility characteristics of clients who are frequent users will still be overrepresented. For example, assume that only two clients made visits to the hypothetical Clinic X. Person 1, who is age 5, male, and Latino, made one visit to the clinic. Person 2, 10, female, and White, made nine visits to the clinic. At the visit level, therefore, we would conclude that 90 percent of the claims (9 out of 10) were made by Whites, 10 year olds, and females. There is nothing wrong with these figures unless we then conclude that 90 percent of the clients visiting Clinic X were age 10.

The limitations of analyses at the visit level also depend on the audience for whom the analysis is intended. Hospital administrators and emergency room workers may find it useful to know that most of their

visits come from youth in a certain age range, for example, since it may indicate the need for certain kinds of resources or personnel. On the other hand, a Medicaid administrator interested in knowing which youth are using clinics would find the same type of visit level results less meaningful.

Since eligibility and demographic data can be linked to utilization data by the client identification number, it was possible to avoid these problems by aggregating claims data to the client level. The analysis file at the client level contained counts of the number of visits to sites, like emergency rooms, and the total cost for each of those types of claims. That file had one record for each of the 4525 individuals in the sample.

This study used the visit level of analysis to describe the aggregate amounts of utilization by eligibles, trends in utilization over time, and the use of emergency room services by day of week and by season. The client level of analysis was used to examine the number of people using specific services, the patterns of care-seeking behavior, the use of different office-based physician specialties, and continuity of care. Table 1 summarizes the topics of analysis, the level of analysis, and the number of cases which were included in the analysis.

Several variables summarizing the claims were created when data were aggregated for the client level file. The type of claims was an important variable for both the claims level and client level files. The ten forms used by different types of providers form an initial grouping of claims. Variables measuring type of provider and type of

clinic further categorized claims. These three variables were used to produce a coding of type of claims with 15 categories. Table 2 lists the 15 categories of claims and their distributions. The claims level file contained a variable for type of claim, while aggregate data on the number and cost of claims for each of the 15 categories were included in the client level file. In addition, the client file had a count on the total number of claims to physicians, emergency rooms, and clinics; the number of claims to each of 17 different physician specialties; the most common provider among physicians, emergency rooms, and clinics; the number of immunizations and CHAP (EPSDT) exams children received; the number of months of eligibility during the study period; and the number of months of consecutive eligibility.

Data recorded for each of the four eligibility periods allowed the computation of three variables describing the individual's eligibility, insurance coverage, and residence. The first variable, MA ever, grouped individuals according to whether they had always been eligible for medical assistance only, sometimes eligible for medical assistance only, and never eligible for medical assistance only. Individuals always eligible for only medical assistsnce had incomes about the welfare level and become eligible for medical services because of a medical crisis in the family. Such individuals could be considered the near-poor. People who were identified as eligible for medical assistance only sometimes were also eligible for public assistance part of the time. These individuals either had some sort of change in financial status or were

technically eligible for public assistance but were unaware of their eligibility until the point at which they entered the welfare system. The third group were eligible for public assistance cash grants all the time, indicating an income below the welfare level.

The second variable indicates whether an individual had private insurance coverage during any of the eligibility periods or whether he never had any private insurance. More detailed categories were not used since the member of individuals with private insurance was too small to divide further. The third variable, Move, indicates whether an individual moved from the township to another. Township was the largest sub-unit of the county reported in the data base. Moves between smaller geographic areas could not be addressed, but moves from one township to another were more likely to affect medical care utilization.

Defining Utilization

Utilization can be measured in several ways. Most simply, utilization can be defined as the number of claims made in a specific time period. This information would be useful for hospital administrators interested in the total amount of utilization during a specific time period and whether there are any trends over time.

Researchers interested in the use of services will want to control for the number of people making claims and compute utilization rates for a standard population. The second measure of utilization is calculated by dividing the total number of claims by the number of eligible people. The chapter on the use of services examines the number of claims

made per month using the first and second measure of utilization. Cromwell and Schurman (1981) note that utilization rates for Medicaid recipients must be calculated with care since clients can be eligible for fractions of a year. Rates which fail to take that into account, thus, would be underestimated. Cromwell and Schurman resolved this issue by computing "person year equivalents" (PYE) by transforming the fractions of years of eligibility into yearly subtotals. Our analyses of utilization by year also computed utilization in this manner.

These three methods of computing utilization were calculated at the visit level of analysis; that is, utilization rates were defined as the total number of claims made in a time period divided by the number of person-years of eligibility for eligible children. These measures of utilization had the properties of the visit level discussed earlier -- they were useful indicators of the amount of use, but had limited value for comparing use by demographic or eligibility groups. These calculations also could not be used to compare individuals with high rates of use against individuals with low rates of use since rates were not computed at the individual client level. The fourth method of defining utilization measured the ratio of the number of claims a client made to the proportion of months eligible during the study. This method is the mathematical equivalent of the claims/person year equivalent, but is computed at the client level. This computation sums claims over the three-year study period and computes an annualized rate of the average number of claims weighted by the number of months eligible. There are two rationales for computing an annualized measure

from the entire study period's data. First, this measure is less likely to be biased by a client's atypical use during a portion of the study period since the larger time span dilutes the impact of atypically high or low periods of use. Second, a measure examining utilization for each calendar year would overestimate use by a person eligible the last six months of year one and the first six months of year two. Third, this measure of utilization can be employed when examining use associated with different histories of medical care; if the medical care history is defined by use during the three year period, the measure of utilization should cover that period as well.

A set of hypothetical data may best illustrate how these four different measures of utilization were computed. Assume that there are four individuals, each of whom makes 15 claims during the three year study period, but who differ in the distribution of claims over the three years and the number of months eligible in the three years. Table 3 presents the claims made by this hypothetical group and the utilization measures calculated for them. Person 1 was eligible for some time in each year, while person 2 was eligible for one year of the three, person 3 was eligible for all years, but made no claims in two of the years, and person 4 was eligible for 2 years. The first measure, counting the number of claims, shows that 20 claims were made in each of the three years. The second measure, the ratio of the number of claims to the number of eligible people shows that use increased over time: 5.0 claims per person were made in 1977, 6.7 claims

per person were made in 1978, and 10.0 claims per person were made in 1979. The third measure which adjusts for the number of months of eligibility by calculating person year equivalents (PYE), shows an even greater increase across the three year period: 5.0 claims per PYE were made in 1977, 8.0 claims per PYE were made in 1978. and 16.0 claims per PYE were made in 1979. The difference between measure 2 and measure 3 illustrates the underestimation occurring when an individual is not eligible for the entire year, as Cromwell and Schurman noted. The client level measure of utilization, measure 4, computes an "annualized" measure of use by dividing each individual's claims by the fractional number of years of eligibility. Person 1 has an annualized rate of 8.6 claims/year, person 2 has an annualized rate of 15.0 claims/year, person 3 made 5.0 claims/year and person 4 made 7.5 claims per year. Note that the measure levels out unusual amounts of use: Person 3 had been eligible for the first two years but made no claims, and then made 15 claims in the last year. This averaged to 5 claims per year. At the same time this technique may produce high estimates for individuals eligible for only short periods of time and making a large number of claims during that short period. This is not a major problem with this data base since most individuals eligible a short period of time make few, if any claims; less than 1 percent of the sample have been eligible a short period of time (under 3 months) and have made claims.

Table 1

Types of Claims Contained in the Medicaid Data Base

	% Claims	% Children Using this Type of Care
Primary care physicians	29.5	54.0
Specialist physicians	7.6	25.8
Emergency rooms	5.5	27.5
Out-patient departments	.4	1.3
Neighborhood health centers	3.2	10.2
Hospital inpatient	1.8	14.2
Dentists	8.5	37.1
Opticians	2.3	13.3
Drug-sick room supplies	31.7	54.0
Lab, x-ray	3.2	17.8
Non-physician providers	1.6	4.4
Equipment	.3	1.0
Other clinics	.7	1.8
Transportation	3.4	7.0
Institution	.1	.2

TABLE 2

Topics, Level of Analysis, and Number of Cases for Each Analysis

Topic	Level	Number of Cases
Utilization of Medical Services	Visit	43,664
Use of Emergency Room	Visit	2,385
Eligibility Patterns	Client	4,222
Use of Office-Based Physicians	Client	2,634
Patterns of Care	Client	2,911
Use/Non-Use	Client	3,734
Continuitiy	Client	2,911

TABLE 3

Utilization Measures for Four Hypothetical Children

People	Year			Measure 4
	1977	1978	1979	# claims/# years eligible
Person 1 # Claims	5	5	5	
Person 1 # Months eligible	12	6	3	8.57
Person 2 # Claims	15	0	0	
Person 2 # Months eligible	12	0	0	15.0
Person 3 # Claims	0	0	15	
Person 3 # Months eligible	12	12	12	5.0
Person 4 # Claims	0	15	0	
Person 4 # Months eligible	12	12	0	7.5
Number of People Eligible	4	3	2	
Person Year Equivalent Eligibility	4	2.5	1.25	
Measure 1 (Total N claims)	20	20	20	
Measure 2 (# claims/# eligible)	5.0	6.7	10.0	
Measure 3 (# claims/PYE)	5.0	8.0	16.0	

Chapter Three

Demographic and Eligibility Patterns in the Sample

As the costs of the Medicaid program have skyrocketed, there has been an increasing interest in program operations. Rymer et al. (1979) note that increases in the number of individuals eligible for Medicaid may have had as much impact on increasing expenditures as increases in medical prices or utilization have had. At the same time, most research on Medicaid examines either provider behavior or the utilization patterns Medicaid recipients while ignoring eligibility issues. Rymer's study of Medicaid eligibility policies and a current project at the American Academy of Pediatrics examining state variations in newborn eligibility policy illustrate increasing interest in issues concerning Medicaid eligibility. However, both studies focus on policy choices rather than characteristics of eligibles. This data base provides an opportunity to examine the relation between eligibility characteristics, utilization patterns, and expenditures as well as to test empirically assumptions about how often welfare clients move, how often they change eligibility status, and how long they are eligible. The data also allow us to examine changes in the population of eligibles over time.

This chapter summarizes eligibility and demographic characteristics of the sample of Medicaid children, describes the patterns of eligibility in Suffolk County and documents significant variations in the sample which could affect further analyses. Four topics are considered: the

frequency with which individuals move from one township to another, the frequency of changes in eligibility status, the length of eligibility, and changes in the composition of the eligibility population over time.

The Suffolk County Information System contains information on up to four eligibility periods for each client in the data base. This includes the dates of each eligibility period, the category of eligibility, the "case type" of eligibility, whether the individual is covered by any kind of private insurance, and the township in which the individual lives. The opening and closing dates denote when a client's eligibility began and when it lapsed. If a client recertified his eligibility before it lapsed and no other information changed, no closing date would be noted. Thus, the eligibility periods do not represent specified lengths of time, but have variable lengths. Data on a second eligibility period is stored in a second set of variables. When a client begins his fifth eligibility period, data from the first period is dropped, and the data from the second through fifth eligibility periods are retained in the system. When this happens, there is no indicator that there have been more than four eligibility periods. Twenty-five percent of the sample, 1165 children, have had four or more eligibility periods, though not all those eligibility periods were during the 1977-1979 study period.

Two variables, category and case type, describe the type of eligibility in each of the periods. CASE TYPE describes the entitlement with which an individual is eligible for Medicaid benefits. A child may be eligible for Medicaid via public assistance through which the family receives cash benefits as well. A child may be eligible for Medicaid only if the family's income is slightly above the eligibility level for cash assistance or if medical needs force them to "spend down" to that level.

These children receive Medicaid benefits, but do not receive cash grants (MAO). Children who are wards of the state, either in foster care or institutional care, are eligible for Medicaid as Child Welfare cases, and handicapped children are eligible through Supplemental Security Income. Approximately 75% of the sample were eligible for Medicaid as Public Assistance recipients for their first eligibility period, while 14% were eligible for MAO. Table 1 shows the proportion of children in each case type for each of the four recorded eligibility periods.

The CATEGORY of eligibility records a more specific basis for a child's eligibility. Children may be entitled to Medicaid benefits in one of the following groups: Aid to the Blind, Aid to the Disabled, Aid to Dependent Children, Aid to Dependent Children with an unemployed head of household, Cuban Relief Program, the Indonesian Relief Program, Emergency Aid to Families, Foster Care, Home Relief, and Home Relief-SSI. The Indonesian and Cuban Relief programs provide assistance to refugees under a special federal entitlement. Children classified as Home Relief-SSI are children New York State believes may be eligible for Supplemental Security Income (SSI) and are therefore required to apply for SSI. Their category is changed when they become eligible for SSI. Approximately 75% of the children fell in the Aid to Dependent Children category for their first eligibility period, while 9.7% had a category of Home Relief. Table 2 summarizes the proportion of children in each of the major eligibility categories for each of the four recorded eligibility periods.

The data base contains three geographic variables: township, village, and zip code. Township is the largest geographic unit and is recorded for

each eligibility period in the file. Table 3 shows the proportion of children residing in each township during the four recorded eligibility periods. Village and zip code represent smaller units and are recorded only once. If a person moves, the former village and zip code are replaced with the current ones, and information about previous residences is lost. An insurance variable describes the kind of private coverage an individual had. Since 89% of the sample had no private insurance, for most analyses this variable was recoded to a dichotomy reflecting the presence or absence of private insurance.

The data base also contains the race, sex, and age of the children (See Table 4). Approximately 62% of the children were White; 22%, Black; and 10% Latino. The proportions of male and female children were almost identical; and the age distribution shows that children born in 1978 and 1979 were a somewhat smaller proportion of the entire sample than older children.

Moving from one township to another

The mobility of a population may affect the utilization of medical services and relationships with private physicians since families who frequently move are less likely to be well integrated into the community or to know health care resources in the community. It is important to document not only the frequency with which people move, but also any demographic differences between those who move and those who stay in the same location. Whether an individual moved from one township to another can be computed since township was included for each of the four recorded eligibility periods.

For this analysis, moving was defined as a change from the township recorded in the first eligibility period.[1] Since children with only one eligibility period by definition can not have moved, they were excluded from calculations of the proportion of children moving. Table 5 shows the proportion of the sample residing in each township during their first eligibility period, the proportion of children in each township having two or more eligibility periods, and the proportion of children with two or more eligibility periods who remained in the same township. For example, 32% of the sample lived in Brookhaven Township during their first eligibility period. Approximately 72% of those children have had two or more eligibility periods. Of the children with two or more eligibility periods, 90% remained in Brookhaven Township throughout their eligibility. The township with the largest number of eligibile children also was Brookhaven, the most stable with 50% remaining in the same township. On the other hand, the township with the second largest number of eligible children, Islip, had the most mobility, with only 71% staying there.

Chi square analyses tested demographic differences between children moving from one township to another and those remaining in the same township. Youth age 9 and younger ($p<.001$), females ($p=.017$), and individuals who

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[1] It should be noted that the actual extent to which eligible children moved is understated in this analysis because moves within a township were not recorded.

were eligible for cash grants during at least part of their eligibility ($p < .001$) were more likely to move than were older youth, males, and individuals eligible for medical assistance only. There were no significant racial differences among children who moved and children who did not move.

Changing Eligibility Status

The data base distinguished between individuals who were eligible for Medicaid because their families received public assistance and those who were eligible even though their family income was too high for cash grants. Thus, we have an opportunity to compare the behavior of the two groups and can examine the extent to which the medically needy had different utilization patterns than the categorically eligible.[2] It is well known that expenditure rates for the medically needy are higher than for other eligibles, but are more likely to maintain a relationship with a physician over time. Are they heavier users of physician and preventive services or of hospital services? Cromwell and Schuman (1981) suggested that the medically needy may have different health needs than the categorically eligible, but their data did not distinguish between the two groups. In later chapters the utilization of children in medically needy families is compared to that of categorically eligible children. Here we examine their eligibility patterns.

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[2] We are able to distinguish between children who were eligible because their families were welfare recipients and those whose families were medically needy, but we are not able to specify which family member in the latter groups had the unusual medical expenses that led them to seek eligibility.

Do individuals eligible for medical assistance only subsequently become cash recipients, too? Table 6 shows the proportion of children initially in each eligibility category and the proportion remaining in that category. The data indicate a wide range in the stability of eligibility categories, that is, in the proportion of children remaining in the same eligibility classification. All youth who were entitled to Medicaid through the Child Welfare Department or Supplemental Security Income remained in that category. Ninety-two percent of children initially eligible for cash grants and medical assistance remained eligible for both throughout their eligibility, but only 63% of those who began as medically needy only remained eligible only for medical assistance. In addition, 93% of the moves[3] from Medicaid only were to Public Assistance. Thus, approximately one-third of the individuals who begin as clients receiving only medical benefits were later recertified as being eligible for cash assistance. Suffolk County officials indicated that this change in eligibility case type often occurred because a person who applied for Medical Assistance during a health crisis later became aware that he or she was eligible for cash benefits as well. This suggests that, for a substantial number of individuals meeting eligibility requirements for public assistance, the first contact with the welfare system was due to a health crisis.

Table 6 also indicates that individuals receiving Medicaid benefits due to a disability seldom move to other categories: all youth in the Aid

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[3] Note that these figures are calculated on the number of moves made rather than the number of individuals. This is because an individual can move more than once, so all moves are counted, and percentages are based on the total number of moves actually made.

to the Disabled category remain in that category, while 79% of those eligible for Aid to Dependent Children stayed in that category. On the other hand, Emergency Aid to Families, ADC Unemployed, and Home Relief were much less stable categories with approximately 25% of each remaining in the same category. In addition, column 4 of Table 6 indicates that individuals in the categories that have the least stability -- Emergency Aid to Families, Home Relief, and ADC unemployed -- are also likely to have more periods in the same category than do children in other eligibility categories. Individuals eligible for Home Relief, Emergency Aid to Families or ADC-unemployed had an average 2.8 eligibility periods in any category, while children in other categories had 2.2 or fewer eligibility periods. There are two possible explanations for the higher number of eligibility periods among these categories. First, individuals in these categories may be more likely to let eligibility recertification slide, and thus have more eligibility periods. In contrast, handicapped individuals may see a more immediate need for maintaining eligibility and recertify their eligibility. Youth in foster care are likely to have only one recorded period of eligibility because child welfare cases are updated manually, and many closing dates are omitted. A second explanation for the higher number of eligibility periods is that Emergency Aid to Families, Home Relief, and ADC-unemployed may be categories people use in emergency situations. Individuals in these categories may need only sporadic assistance and may have shorter and more frequent eligibility periods. Column 5 of Table 6 confirms this; the average number of months eligible in Emergency Aid to Families, ADC-unemployed, and Home-Relief are much lower

than the months of eligibility in other categories. Thus, Home Relief, Emergency Aid to Families and ADC Unemployed are categories which are used frequently for very short periods of time.

Table 7 examines children eligible for categories which are the least stable -- Emergency Aid to Families, Home Relief, and ADC-unemployed -- and the categories to which these children move. The figures in Table 7 represent the number of moves rather than the number of clients moving. The maximum number of possible moves is four times the number of individuals in these categories; percentages are based on the total number of moves which are made. Almost half the moves from ADC-unemployed, Emergency Aid to Families, and Home Relief were to Aid to Dependent Children. The other half moved from one "emergency" category to another. Thus, many individuals who initially enter the welfare system on a temporary "emergency" category became eligible for other types of assistance; half moved into the more stable ADC category and half, to other emergency categories.

In sum, many children entering the welfare system as eligible for medical assistance only or one of the emergency categories, such as Home Relief or Emergency Aid to Families, later became eligible for cash grants as well. Medical needs, then, often served as an introduction to the welfare system.

Length of Eligibility

Eighty-four percent of the children in the sample were eligible for less than the entire three year study period and the average length of eligibility was 16.6 months. Fifty-five percent of the individuals in

the sample had at least 12 months consecutive eligibility. These figures exclude child welfare children since their eligibility data are unreliable. While most children had continuous eligibility, 17% have gaps in their eligibility. Chi square analyses were conducted to determine whether there were significant demographic differences in length of consecutive eligibility. Months of consecutive eligibility were grouped into three categories of similar size: consecutive eligibility less than one year, 1-2½ years, and 2½-3 years, while individuals 18-20 and 0-2, were more likely to be eligible less than a year ($p < .001$).

As mentioned earlier, individuals eligible under ADC-unemployed, Emergency Aid to Families, Home Relief, or the Ethnic Relief Program were more likely to have less than one year of eligibility ($p < .001$), while individuals eligible through Aid to the Blind or Disabled were more likely to have 2½-3 years eligibility during the study. Similar findings held for the category of eligibility: children eligible for Medicaid only were disproportionately eligible one year or less, while SSI and Child Welfare children were eligible 2½-3 years ($p < .001$). Individuals with private insurance during the first period of eligibility were more likely to have been eligible less than one year ($p < .001$).

The length of eligibility in each category and case type was computed in terms of Person Year Equivalents (PYE) since children were eligible for variable lengths of time. The Person Year Equivalent sums the fractional years of eligibility for each client, and reports the number of "Person-years" for each category. Since this study covers three years, the number of months of eligibility in each category was summed and divided

by 36. Thus, the number of person years in each category reflects the length of time spent in each category, rather than simply the number of children in that category. Table 8 lists the PYE for each category and case type. Public Assistance is the most prevalent case type, representing 86% of all PYE, while the least common case type is Supplemental Security Income. The most frequent category, Aid to Dependent Children, represents 83% of all PYE. The next most common categories are Home Relief, ADC-unemployed, and Aid to the Disabled, representing 6.9%, 5.4%, and 4.2% of all PYE respectively. The other groups had only negligible person years of eligibility.

In summary, children were eligible for an average 17 months during the study. Few children had a truly sporadic pattern of eligibility: 55% of the sample were eligible for at least 12 months without interruption. Aid to Dependent Children and Public Assistance, by far, had the most person years of eligibility. While mandatory Medicaid recertification every six months was designed to detect changes in the client's eligibility, the data suggest that a substantial proportion of clients do not change status that rapidly.

Changes in the Sample Over Time

While individual clients were eligible for many months at a time, many enter and leave the Medicaid system in any one month. For this reason, racial, sexual and age characteristics which affect utilization of services, could change over time. Figures 1 and 2 are cumulative percent graphs showing the stability of the racial and sexual distributions of the sample. Figure 1 shows the proportion of the sample of each race;

in January, 1977 65% of the sample was White, 25% was Black and 10% were Latino or other. Figure 1 indicates a small decrease in the proportion of White children in the sample over time, with slight increases in both the Black and Latino population. Figure 2 shows that the sexual distribution of eligibles was relatively stable; approximately 46% of the sample were female throughout the period. Figure 3 demonstrates the average age of the sample increased during the study period even though newborns were being added continually. The average age in January, 1977 was 9.6 years, while in December 1979 it was 10.4 years. This may reflect a decline in the birth rate in Suffolk County.

For the most part, the sample appears to have been relatively stable. It suggests that observed changes in utilization cannot be atrributed simply to differences in the sample over time. Movement from one township to another which will allow us to compare the utilization of children integrated into a community with those from more mobile families. In addition, the movement from other eligibility categories to Public Assistance, which may indicate a change in the financial status of the family, also reflects the fact that many families eligible for cash grants entered the welfare system during periods of medical crisis. These factors related to eligibility may affect expenditures, too, and, therefore, as we examine utilization and expenditure patterns in subsequent chapters, we will refer to them continually.

TABLE 1

Proportion of Children in the Sample with Each Case Type of Eligibility for Each Eligibility Period

Case Type	Eligibility Period			
	1	2	3	4
Public Assistance	75.6%	81.1%	83.0%	84.2%
Medical Assistance Only (MAO)	13.6	15.6	15.7	15.1
Supplemental Security Income (SSI)	3.2	1.3	1.2	.7
Child Welfare	6.7	1.9	.2	0
Pensing/Unknown	.9	0	0	0
NUMBER OF CASES	4,525 (100%)	2,954 (100%)	1,889 (100%)	1,165 (100%)

[1] Percentages are based on the number of children having that many eligibility periods.

TABLE 2

Proportion of Children in the Sample with Each Category for the Four Recorded Eligibility Periods

Category	Eligibility Period			
	1	2	3	4
Aid to Dependent Children	74.1%	69.9%	64.3%	64.2%
Home Relief	9.7	14.6	15.7	15.0
ADC Unemployed	7.4	9.9	12.6	11.3
Emergency Aid to Families	3.4	3.8	5.8	8.2
Aid to the Disabled	3.1	1.3	1.2	.8
Other and Unknown [1]	2.2	.5	.5	.3
NUMBER OF CASES [2]	4,525 (100%)	2,954 (100%)	1,889 (100%)	1,165 (100%)

[1] Other and Unknown includes Children eligible for the following Programs: Foster Care, Aid to the Blind, Cuban Relief Program, Indonesian Relief Program, or Home Relief - Apply SSI.

[2] Percentages are based on the number of children having that many eligibility periods.

TABLE 3

Proportion of Children in the Sample Residing in Each Township for Each Eligibility Period

Township	Eligibility Period			
	1	2	3	4
Brookhaven	32.5%	36.2%	38.0%	39.6%
Islip	24.6%	25.5%	25.8	24.5
Babylon	18.5	18.3	18.1	18.0
Huntington	4.6	4.7	4.5	4.5
Riverhead	3.4	3.8	3.6	4.2
Smithtown	3.0	2.8	2.7	3.4
South Hampton	2.4	2.7	2.9	1.9
Other within county[1]	1.8	1.8	1.9	1.9
Outside county	.6	.9	1.0	1.0
Unknown	8.7	3.2	1.4	.7
NUMBER OF CASES	4,525 (100%)	2,954 (100%)	1,889 (100%)	1,165 (100%)

[1] Includes East Hampton, Shelter Island, and Southold townships.

TABLE 4

Sex, Year of Birth and Race
of All Children in the Sample

Race	% of Children	Year of Birth	% of Children
White	62.2%	1959	5.2%
Black	22.5%	1960	5.1%
Latino	9.4%	1961	5.0%
Other	.3%	1962	5.4%
Unknown	5.6%	1963	4.9%
		1964	5.7%
		1965	4.9%
Sex		1966	5.2%
		1967	4.5%
Male	48.1%	1968	4.9%
Female	46.3%	1969	4.9%
Unknown	5.6%	1970	5.1%
		1971	4.9%
NUMBER OF CASES	4,525	1972	4.3%
		1973	4.3%
		1974	5.0%
		1975	4.8%
		1976	4.1%
		1977	5.4%
		1978	3.4%
		1979	3.0%
		NUMBER OF CASES	4,525

TABLE 5

Proportion of Children Moving
from One Township to Another

	(1) % of Sample Living in This Township During First Eligibility Period	(2) % of Those Living There (Column 1) Who were Eligible for Two or More Eligibility Periods	(3) % of Those with Two or More Eligibility Periods (Col. 2) Staying in the Same Township
Brookhaven	32.5%	71.8%	90.3%
Islip	24.6%	69.3%	71.2%
Babylon	18.5%	65.8%	85.8%
Huntington	4.6%	65.6%	84.7%
Riverhead	3.4%	73.4%	80.5%
Smithtown	3.0%	60.0%	86.4%
South Hampton	2.4%	74.8%	78.3%
Other[1]	1.8%	63.4%	84.6%
Unknown	8.7%	--	--

[1] Includes East Hampton, Shelter Island, and Southhold townships.

TABLE 6

Proportion of Children Remaining in the Same Case Type and Category of Eligibility

	(1) % of Sample in this Eligibility Classification During First Eligibility Period	(2) % of Children in That Classification (Column 1) Eligible for Two or More Eligibility Periods	(3) % of Children with Two or More Eligibility Periods (Column 2) Staying in Same Eligibility Classification	(4) Average Number of Eligibility Periods	(5) Average Number of Months Eligible
Case Type					
Public Assistance	76.0%	68.9%	92.5%	2.4	17.0
Medical Assistance Only	13.6	75.9	62.7	2.2	9.8
Child Welfare	6.7	18.2	100.0	1.2	---[2]
Supplemental Security Income	3.3	26.4	100.0	1.5	21.0
Unknown	.3	---	---	---	---
Category					
Aid to Dependent Children	74.1	63.5	78.6	2.2	17.6
Home Relief	9.7	81.1	27.7	2.9	7.6
ADC Unemployed	7.4	78.5	24.3	2.8	7.0
Emergency Aid to Families	3.4	85.9	26.9	2.8	2.0
Aid to Disabled	3.1	24.3	100.0	1.4	20.1
Other[1]	1.8	34.5	10.3	1.4	13.5
Unknown	.4	---	---	---	---

[1] Includes Aid to Blind, Cuban Relief Program, Foster Care, Home Relief-SSI and Indonesian Relief Program

[2] Months for Child Welfare and Foster Care are unreliable and therefore excluded from this calculation.

TABLE 7

Number of Moves from the Least Stable Categories and Where They Move

	Subsequent Category						Total Number Moving
	ADC	ADCU	AD	EAF	HR	HRSSI	
Emergency Aid to Families	95 95 (46.1%)	35 35 (17.0%)	--	8 (3.9%)	68 (33.0%)	--	206
Home Relief	264 (48.7%)	159 (29.3%)	--	55 (10.1%)	59 (10.9%)	5 (.9)	542
ADC Unemployed	209 (46.1%)	56 (12.4%)	2 (.4)	29 (6.4%)	155 (34.2%)	2 (.4%)	453

TABLE 8

Person Year Equivalents (PYE) in Eligibility Categories Excluding Child Welfare Children

Eligibility	PYE	% of All PYE
Case Type		
Medicaid Only	189.4	9.7
Public Assistance	1,676.9	85.9
Supplemental Security Income	85.2	4.4
TOTAL	1,951.5	100.0
Category		
Aid to Blind	1.4	.1
Aid to Disabled	82.0	4.2
Aid to Dependent Children	1,614.2	82.7
ADC-Unemployed	104.8	5.4
Cuban Relief Program	.6	.0
Emergency Aid to Families	8.1	.4
Home Relief	134.4	6.9
Home Relief - SSI	4.5	.2
Indonesian Relief Program	1.3	.1
TOTAL	1,951.3	100.0

FIGURE 1

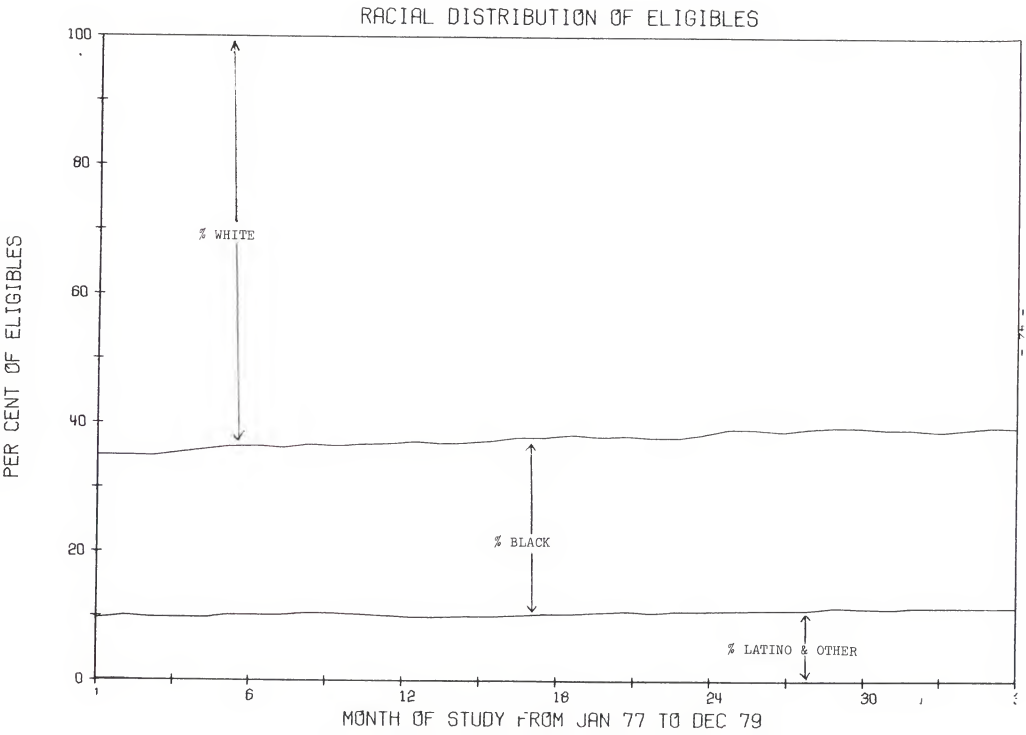

RACIAL DISTRIBUTION OF ELIGIBLES
PER CENT OF ELIGIBLES
100
80
60
40
20
0
% WHITE
% BLACK
% LATINO & OTHER
1
6
12
18
24
30
MONTH OF STUDY FROM JAN 77 TO DEC 79

FIGURE 2

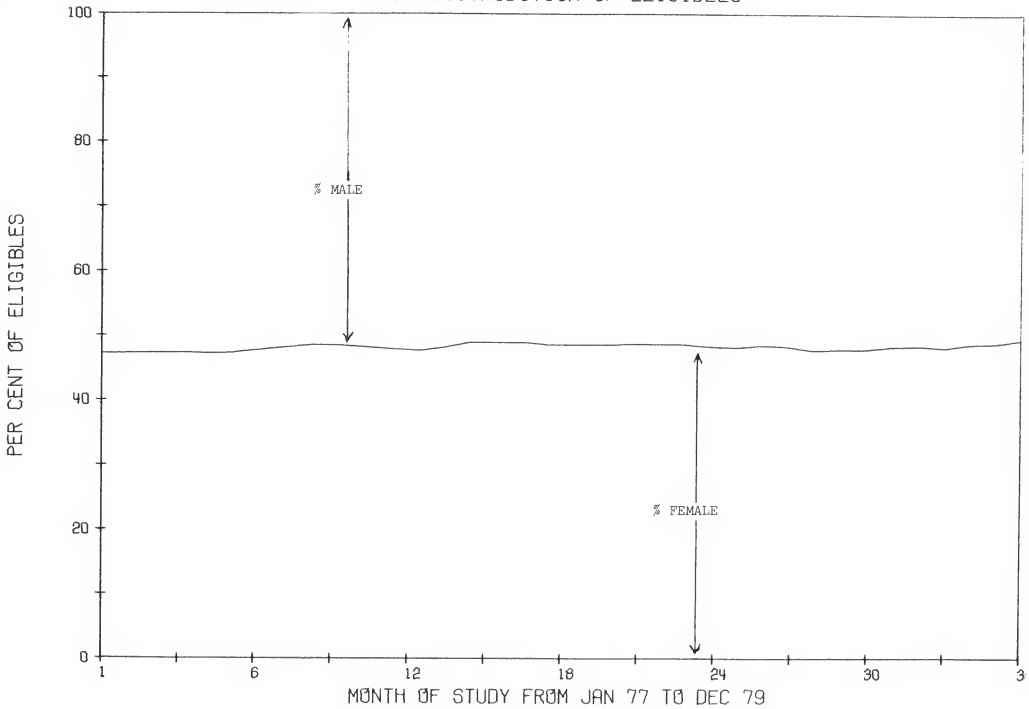
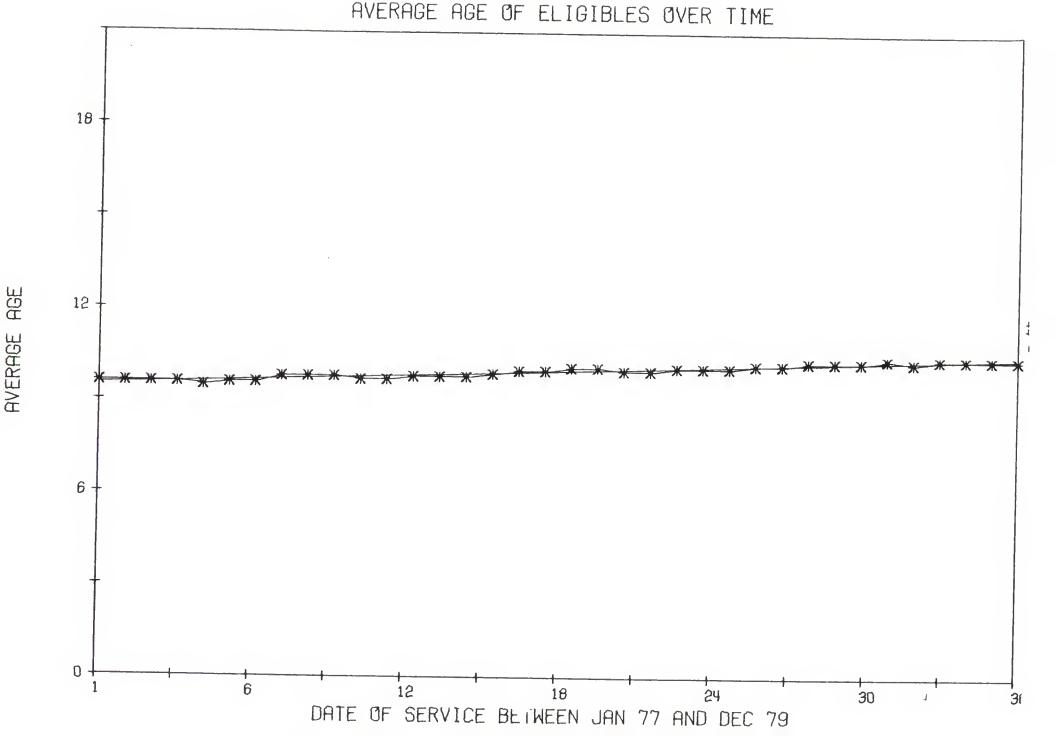

SEX DISTRIBUTION OF ELIGIBLES
PER CENT OF ELIGIBLES
100
80
60
40
20
0
% MALE
% FEMALE
1
6
12
18
24
30
3
MONTH OF STUDY FROM JAN 77 TO DEC 79

FIGURE 3


AVERAGE AGE OF ELIGIBLES OVER TIME
AVERAGE AGE
18
12
6
0
1
6
12
18
24
30
DATE OF SERVICE BETWEEN JAN 77 AND DEC 79

Chapter Four

Utilization of Medical Services

Trends in the utilization of medical services have been studied extensively. Some studies discuss an increase in the utilization of hospital-based services, such as the emergency room or outpatient department (Prybil, et al., 1977; Baltzan, 1972; Jacobs et al., 1971). Some document seasonal fluctuations in the use of services while others examine the effects of predisposing factors, such as age and health status on utilization (Anderson & Aday, 1978; Anderson, 1973). Sklar (1970) and Torrens and Yedvab (1970) compare utilization in individual sites as a way of testing the effect of hospital location and geographic variables on utilization.

Some studies focus on particular groups of users, including the poor. Bice et al. (1972) note that the greatest increase in utilization has been among the poor, and Butler and Scotch (1978) report that the utilization of clients eligible for Medicaid is now comparable to that of non-Medicaid populations if not slightly higher. Rabin, Bice, and Starfield (1974) and Rabin and Schach (1974) argue that since the poor have a higher incidence of morbidity, their utilization should be higher than the non-poor. Roghmann et al. (1971) and Wolfe (1980) found, however, that while utilization of the poor has reached levels comparable to that of the non-poor, the poor still are less likely to receive periodic care from an office-based physician.

Medicaid expenditures for both children and adults in Suffolk County rose from a monthly average of $6,652.000 in 1977 to an average of

$8,336,000 per month in 1979. It is important to determine what factors contributed to the dramatic increases in costs. Increases in costs do not appear to be related to an increased number of people eligible for Medicaid. Data on the number of eligibles in 1977 is not available, but the number of eligibles in 1977 is not available, but the number of children and adults eligible for Medicaid declined from 89,240 in December 1978 to 80,864 in December, 1979. Are there higher rates of utilization? Or are people using different -- and more expensive -- types of care? This chapter tests four hypotheses about the utilization of medical services by children eligible for Medicaid: 1) that rates of utilization of physician, clinic, and emergency room services has been increasing over time; 2) that utilization varies with age; 3) that children eligible for medical assistance only have higher levels of utilization, and 4) that utilization of hospital-based services differs from one institution to another. Each hypothesis is discussed in turn in the following sections.

Data reported in this chapter are at the visit level of analysis. Age and eligibility characteristics of individual clients are disaggregated and attached to individual claims. The utilization rates reported by demographic characteristics therefore, do not necessarily reflect the distribution of clients making visits, since some clients may make more visits than others. The limitations of analyses at the visit level were discussed in more detail in Chapter 2. This chapter uses the visit level of analysis to produce data comparable to other utilization rates. Subsequent chapters examine the utilization of the emergency room, office-based physicians, and patterns of care at the client level of analysis.

1. Increases in the utilization of medical services.

The utilization of services is examined first on a monthly basis and then on an annual basis. Figure 1 graphs the number of children eligible during each month of the study. The graphs number the months of the study, month 1 is January, 1977, month 13 is January, 1978, and month 25 is January, 1979. The regression line which indicates the trend over the period, reveals that the number of eligibles showed remarkable stability during the study period, although the number varied somewhat from month to month. Increases in utilization, therefore, cannot be attributed to increases in the number of children eligible for Medicaid.

Figure 2, on the other hand, shows graphically that the total number of claims per 1,000 eligibles declined over time. The highest number of claims was approximately 790 in February, 1977 and the lowest was 500 per 1,000 in September 1979. With the exception of number eligible and total number of claims, all graphs are plotted on the same scale so that the height of the lines indicates the relative amount of use of each of the types of care. Figures for the most commonly used services (office-based physician care, especially primary care physicians, drug claims, dental care, and specialist physicians), show similar patterns (See Appendix 2). Drug claims and claims to primary care physicians are somewhat variable but have generally declined over time. The use of dentists and specialist physicians decline slightly as well, but have less variance in their use. Use of the emergency room is fairly stable with little variability. Fewer claims are made to clinics; more are to neighborhood

health centers than to out patient departments. Lab and x-ray services, optical services and inpatient hospitalization are used less frequently and appear stable during the study period. The graphs indicate that office-based physician care is used more frequently than institutional care in the ER or clinic. Furthermore, use of the ER and clinic does not change during the study period.

Another way of looking at utilization is to compute the number of claims made each year per person year equivalent (PYE). Cromwell and Schurman (1981) developed PYE measures to address the problem of clients who are not eligible for an entire year. PYE sums the fractions of years of eligibility represented by clients eligible at some point during the year. Table 1 shows the number of claims per 1000 PYE for 1977, 1978, and 1979 for different types of claims. The tables compute utilization rates for most of the types of claims distinguished in the data base. The first category -- physician, ER and clinic -- sums utilization of these three types to report the number of visits to physicians in any site. The physician category reports visits to office-based physicians and is subdivided into primary care physicians (pediatricians, GPs, FPs, internists, and osteopaths) and specialists. The "other" category combines infrequently used services -- institutions, transportation, other clinics, and non-physician providers. The downward trend in utilization is less visible in these annual figures than it appeared to be in the monthly data presented above. A decline in annual use is observable for most types of claims, but 1978 and 1979 figures are very similar. The decline may

be due to unusually high utilization in 1977 or to some factor which reduced utilization rates after 1977 and has not been reversed. More data is needed to determine which annual utilization rates are "normal."

Office-based physicians are the provider type most frequently seen by Medicaid children. In 1977, 3,128.2 visits per 1,000 PYE were made. The figures dropped to 2,595.4 per 1,000 PYE in 1978 and 2,578.8 per 1,000 PYE in 1979. Among office-based physicians, the greatest number of claims were made to primary care physicians. Again, there is a drop in utilization from 1977 to 1978, with 1978 and 1979 appearing very similar. Visits to specialists, which represent a smaller proportion of the visits to office-based physicians, also were highest in 1977 and continued to decline between 1978 and 1979 although the latter reduction was much smaller than the 1977-1978 drop. The utilization of physicians in all sites was measured by combining the use of physicians, ERs, and clinics (OPD and NHC). The highest amount of use of physicians in any site was in 1977; and use was very similar in 1978 and 1979.

Similar patterns are found in inpatient hospital stays, drug claims, lab/x-ray, and to a lesser extent, equipment claims. Emergency room utilization rates declined each year. This finding differs from previous studies citing increases in the use of the emergency room. Dental and optical claims also show a decrease over all three years. The utilization of outpatient departments and neighborhood health centers differ from the two previous patterns described. The use of OPDs increases from 1977 to 1978 and then declines in 1979 to a level comparable to 1977. The use of NHCs, on the other hand, declined from 1977 to 1978 and then increased in 1979 to a level comparable to 1977.

Computing utilization in these two ways produces different impressions of the decline in utilization. The monthly data indicates a continuous decline over time, while the annual utilization figures suggest more stability, with 1977 utilization substantially higher than subsequent years. Monthly data for 1978 and 1979 were plotted in order to determine whether the decline in use over the three year period was due to high use in 1977 and a precipitous drop early in the period or whether utilization declined steadily during the three years. Table 2 lists the slope of the regression line when monthly figures for all three years are examined and when 1977 is excluded. Utilization continues to decline between 1978 and 1979 for most types of services, but at a much smaller rate. The total number of claims has a slope of -6.26 for the 1977-1979 period, but the slope for 1978-1979 is -2.56. Similar changes occur for physician utilization, primary physician utilization, drug use, and transportation claims. The utilization of the emergency room, inpatient care, dental care, and equipment use declines at approximately the same rate for the 1978-1979 period as it does for the entire period. When 1977 is excluded, there is an increase in the use of clinics, especially neighborhood health centers and other clinics (e.g., planned parenthood), and an increase in institution claims. The use of outpatient departments appeared to increase slightly over the three year period, with a slope of .02, but declines slightly between 1978 and 1979 with a slope of -.05. Since OPD was small, minor variations could affect the slope.

In addition to the general decline in utilization, some seasonal variations in use were observed. The concept of seasonal variation in

data measured across time is clear. The utilization of office-based physicians may peak during winter months when colds and other illnesses are more prevalent, for example, and decline during summer vacations. If a data set has high values during the same month or months for several years, a seasonal pattern exists; and, in fact, seasonal patterns do seem to exist in these data to a limited extent. The total number of claims peaks in winter months of February, 1977, January, 1978, and November, 1978. On the other hand, utilization in February 1978 is noticeably low; Suffolk County staff noted that there were heavy snows that month which limited access to all but the most necessary visits. The total number of claims appear to be lower during mid-summer months of July 1978 and 1979. Utilization of primary care physicians and drug claims was lowest in July, 1977, 1978, and 1979. Utilization of physicians was high in the winter months of December 1977, and January 1979 while drug use was high in February 1977, December 1977 and January 1979. While there appears to be some seasonal pattern, variation appears to occur on a quarterly basis.

While utilization of medical services did not increase and appeared to decline slightly, the number of claims per person may be higher among the sample of Medicaid children than among the non-poor. Data from the 1974 Health Interview Survey indicate that children under 18 had an average of 4.1 physician contacts per year (Health: 1978). Dividing figures in Table 1 by 1,000 indicates that in 1977 a child had approximately 3.9 visits per PYE to either a physician, ER, or clinic, and had an average 3.2 visits per PYE in 1978 and 1979 indicating that

utilization rates are close to but slightly below the national average.[1] The Health Interview Survey indicates that babies had an average of 5.0 physician contacts per year while children 6-15 averaged 1.5 visits per year. Dividing age specific utilization figures from Table 3 by 1,000 shows that children four and younger made an average 6.4 per PYE in 1977, 5.0 visits/PYE in 1978, and 4.8 visits/PYE in 1979. Children between 5 and 9 made 4.1 visits in 1977, 3.2 visits in 1978 and 1979, while children 10-14 made 2.8 visits in 1977, 2.5 visits in 1978 and 1979. Thus, it appears that younger children make fewer visits than the national average while older children had slightly more physician contacts than the national data would predict. The following section discusses age differences in utilization in greater detail.

The graphs of monthly utilization indicates some decline in utilization during the three year period, although the annual figures show more stability over the three years. The data do not support the notion that the general growth in Medicaid expenditures for children in the county derives from increases either in numbers of eligibles or in rates of utilization. The number of eligibles did not increase during the study period, nor did utilization. In addition, utilization of Medicaid-eligible

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[1] It should be noted that some of the differences in results may reflect methodological variations. The continuous Health Interview Survey asks respondents to recall their utilization experience for the previous two weeks, and annual rates are calculated from those answers. Those results, thus, depend on the accuracy of recall and the representativeness of the sampled utilization. Lower rates in the present study may be explained in part by the method for calculating person-year-equivalents and by utilization not paid for by Medicaid. In addition, since utilization rates nationally have been declining, the fact that the interview data were from a 1974 survey may also have tended to inflate the actual differences.

children appears to be comparable to national averages if not slightly lower. The data do not disprove an overall increase in utilization of medical services if the Suffolk County experience is representative but, indicate that the utilization of Medicaid-eligible children during this time period does not reflect such an increase and probably does not contribute to the growth of medical expenditures. The rates of utilization appear to have been relatively stable during the study period although some seasonal or age deviations in use were observed within the general pattern.

2. Age differences in utilization.

Most studies of utilization by children indicate that younger children make more claims and that older youth are more likely to make claims to an emergency room or clinic. Table 3 shows the utilization per 1,000 PYE in each year for children 4 years and younger, 5-9 years, 10-14 years and 15-21 years for each year of the study. Utilization of physicians is highest among children age 4 and under; the second highest level of utilization was among children age 5-9. The utilization of specialists shows a high number of visits made by youth age 15 and older. Children age 4 and younger also have the highest use of neighborhood health centers, drugs, and all services combined; rates of use decrease as age increases. The rate of emergency room visits is consistently highest among children age 4 and younger. The rate of inpatient hospitalizations is highest for children age 4 and under, though that figure includes newborn stays. The rate of hospitalizations is lowest among children 5-9 and is dramatically

higher for youth 15-21. The latter rate may be accounted for in part by teenage pregnancies, although the existing data cannot test this assumption. Outpatient department visits are highest among children 4 and younger and youth 15 and older. The utilization of lab and x-ray services fluctuates across age groups from year to year. The number of optical and dental claims is much lower among children age 4 and under than for other groups, and children age 10-14 are the highest users of both services. Thus, utilization is highest among children age 4 and under for most services, though for some, including specialist physicians, outpatient departments, and hospitalizations the older youth are the highest users.

An increase in the age of the sample moderated the decline in overall utilization noted in the first section. Utilization rates for most services declined more sharply for younger children than for older ones. Moreover, the second year showed either a reduced rate of decrease or, in some instances, an increase in utilization.

Thus, for example, the combined use of physicians, ERs and clinics declined by 21.8% among children 4 and under between 1977 and 1978, but only by 4.6% in the second year. For all other age groups the declines observed in the first year were followed by small increased rates of use between 1978 to 1979. The physician utilization declines for children 4 and under and those 5-9, but increases between 1978 and 1979 for children 10-14 and, to a lesser extent, for youth 15 and older. Emergency Room utilization showed substantial reductions throughout the study period

for all age groups. The utilization of outpatient departments and neighborhood health centers differ from that of other services. Outpatient department claims followed no systematic pattern, perhaps because of the relatively small amount of utilization. For children age 14 and under, the neighborhood health center utilization declined sharply between 1977 and 1978 and then increased between 1978 and 1979, but to a level lower than that in 1977. The utilization of neighborhood health centers increased for youth 15 and older.

Examining age specific utilization does not clearly account for all reductions observed for the five types of services whose utilization clearly declined over the study period -- specialist physician, emergency room, dentist, optician and lab/x-ray. The first three continued to decline when age-specific utilization was examined. Since optical and lab/x-ray claims did not have the same decline in all of the age-specific groups, however, it appears that age was a factor for the changes found in those two types of services.

3. Utilization of the Medically Needy.

Cromwell and Schurman (1981) have noted the need to differentiate between individuals eligible for Medicaid as recipients of public assistance cash grants and those eligible because of a medical crisis in the family. Cromwell and Schurman (1981) assume that utilization will be higher among medically needy families, but were unable to distinguish public assistance clients from those eligible for only medical assistance. The Suffolk County Medicaid Information System does distinguish between

families in the two programs but does not indicate which individual(s) in the family have the unusual medical need. Those eligible for MAO may have a greater medical need, but may also be less poor than the categorical eligible.[2] On the basis of the evidence from other studies, we assume that those individuals will make more claims than individuals eligible for public assistance.

Table 4 shows utilization in each year by individuals eligible for Medicaid only and by those eligible for Public Assistance. The number of visits per 1,000 PYE is somewhat higher for individuals eligible for Public Assistance: more visits were made by public assistance individuals to physicians, emergency rooms, neighborhood health centers, opticians and pharmacists. In addition, more total claims per 1,000 PYE were made by individuals eligible for public assistance. While few visits were made by children eligible for Medicaid only, the Medicaid only clients appear to make more claims for specialized services.

More visits per PYE are made to specialist physicians, outpatient departments, dentists, lab/x-ray, and there are more hospitalizations. It appears that overall rates of utilization are not higher among children eligible for Medicaid only because ordinary ambulatory services, including prescriptions, dominate the utilization picture. Children eligible for medical assistance only, on the other hand, do tend to use the more expensive specialty and hospital services to a greater degree probably reflecting the fact that it was relatively serious illness which led them to seek eligibility for benefits.

[2] This is not necessarily true, however, since eligibility criteria for MAO in New York are similar to those for AFDC. See Davidson, 1979.

4. Utilization by Site of Service.

Many articles on utilization of medical care recognize that utilization varies from one location to another and that characteristics of the site may have an effect on utilization. Those articles also recognize the need to study utilization differences by all hospitals in a community. This section reports preliminary findings comparing hospitals used by children eligible for Medicaid. Further analysis incorporating geographic data and information on the availability of physicians is needed, but was beyond the scope of the current project.

Forty-seven different hospitals were used by the sample of children, though only 18 had 10 or more visits during the three year period. Of the 18 hospitals commonly used, 13 are in Suffolk County and five are in neighboring Nassau County. Sixty-two percent of all visits to hospitals were for emergency room claims, 21% were inpatient claims, 12% were for lab or x-ray, and 5% were outpatient department claims. While 62% of all hospital claims were to the ER, only 10% of Nassau County's hospital claims were ER claims, indicating that ER use is generally limited to facilities closer to the client's home. Three of the Nassau County hospitals generated approximately 60% of their claims in outpatient departments while the other two had a higher proportion of inpatient admissions. Moreover, only five of the frequently used hospitals provided outpatient department care at all, three of those were in Nassau County. This suggests that visits outside the county may have been for more specialized care, though this cannot clearly be tested since the actual services provided are not included in the data base.

Hospitals differ in the demographic characteristics of children making visits. There are racial differences in ER use ($p < .001$), OPD use ($p < .001$) and inpatient use ($p < .001$). There are sex differences in ER use ($p < .001$) and OPD use ($p < .001$). There are some age differences in ER use ($p < .001$), OPD use ($p < .001$) and inpatient use ($p < .032$). Hospitals also differ in the proportion of claims by children eligible for only Medicaid in the ER ($p = .039$), OPD ($p = .005$), and inpatient claims ($p = .002$). No differences were observed in ER use by day of the week, nor were there differences in whether the individual had supplemental insurance. Table 5 lists the over-represented group for each type of claim for each hospital.

Characteristics of the individual hospitals may also affect utilization. Whether a hospital had residents, a medical school affiliation, and the number of house staff were compiled for each hospital in Nassau and Suffolk County from the 1978 Directory of Residency Programs. Information on the number of acute care and pediatric beds in 1978 was taken from the Nassau-Suffolk HSA Health Plan. Chi-square analysis and analysis of variance were used to determine if hospital characteristics affect utilization. Visits to outpatient clinics, especially specialty clinics, occurred in large hospitals with more beds and a larger house staff. Inpatient hospitalizations and outpatient department claims are more likely to occur in hospitals with a medical school affiliation ($p < .001$), and a house staff ($p < .001$), while ER claims represent a higher proportion of claims made to hospitals without a medical school affiliation. A higher proportion of visits for the follow-up of acute conditions and chronic conditions is made to hospitals with

medical school affiliations ($p<.001$), and a house staff ($p<.001$). Obviously, the fact that outpatient departments are located in larger hospitals with a house staff and a medical school affiliation probably explains differences in distributions by type of visit. Visits to medical, pediatric, and obstetric clinics are more likely to occur in hospitals with medical school affiliations ($p<.001$), and a house staff ($p<.001$). This again reflects the fact that the outpatient departments offering these clinics exist at the larger hospitals with more resources.

Thus, outpatient departments visits usually occur in larger hospitals with residents, a house staff, or medical school affiliations. More importantly the data indicate that emergency room visits are likely to be made to hospitals with no medical school affiliation or house staff where ER visits pose a greater strain on the hospital's resources. Sixty-three percent of ER claims are to hospitals without a medical school affiliation, and 77 percent are to hospitals with no house staff. Thus, while some larger hospitals may be well equipped to handle "non-emergent" clients and may even need those cases to keep students busy, the majority of emergency room claims in Suffolk County are made to smaller hospitals lacking those resources.

TABLE 1

Number of Claims Per 1,000 PYE Eligible 1977-1979

	1977	1978	1979
Physician, ER, and Clinic	3,889.9	3,238.9	3,202.0
Physician	3,128.2	2,595.4	2,578.8
Primary Care	2,470.5	2,051.5	2,073.4
Specialist	657.7	543.9	505.5
Emergency Room	479.4	401.3	388.9
Outpatient Department	25.0	40.0	35.2
Neighborhood Health Ctr.	256.7	202.2	249.0
Hospital Inpatient Admissions Claims	152.8	127.8	125.0
Inpatient Days	793.5	523.4	666.2
Dentist	678.7	632.7	580.6
Optical	182.3	176.5	164.5
Drug	2,775.1	2,143.8	2,156.4
Lab, X-ray	294.1	220.1	207.0
Equipment	30.0	19.5	13.1
Other	548.8	354.0	410.4
Total Claims/1,000 PYE	8,551.1	6,913.4	6,859.1
Total Number of Claims	17,122.0	13,473.0	13,054.0
Total Number Eligible	2,859.0	2,761.0	2,719.0

TABLE 2

Slopes of Regression Lines of Utilization
for 1977-1979 and 1978-1979

Type of Claim	1977-1979	1978-1979
Physician claims	-1.98	-.75
Primary Care Physicians	-1.44	-.43
Specialist Physicians	- .54	-.32
Emergency Room	- .42	-.42
Clinic	- .02	.17
OPD	.02	-.05
Neighborhood Health Ctr.	- .05	.22
Other Clinic	- .04	.07
Dental	- .42	-.46
Inpatient	- .10	-.10
Optical	- .09	-.10
Drug	-2.27	-.76
Lab	- .33	-.19
Equipment	- .05	-.04
Transportation	- .35	-.08
Institution	- .01	-.03
Non-Physician Practitioner	- .17	-.00
Total Claims	-6.26	-2.56

TABLE 3

Age-Specific Utilization Per 1,000 PYE Eligible

	Birth-4			5-9		
	1977	1978	1979	1977	1978	1979
Physician, ER, Clinics	6407.0	5007.5	4777.9	4077.4	3199.5	3223.6
Physician	5070.1	3954.1	3797.9	3388.1	2664.2	2644.4
Primary Care	4418.9	3446.6	3390.6	2695.2	2146.8	2136.8
Specialist	651.2	507.5	407.3	692.8	517.4	507.6
Emergency Room	763.6	640.6	472.0	409.3	310.1	317.2
Outpatient Dept.	50.4	56.4	35.9	8.9	21.7	30.7
Neighborhood Health Group	522.8	356.4	472.0	271.1	203.4	231.3
Hospitalization	389.8	284.2	330.7	90.4	59.2	51.2
Dentist	167.4	200.8	148.6	816.9	738.6	652.9
Optician	43.6	31.6	59.9	170.1	195.5	198.5
Drug	4577.1	3401.5	3412.1	3342.0	2294.9	2372.2
Lab,X-ray	293.5	214.2	179.7	235.7	205.4	186.2
Other	554.9	221.0	496.0	634.4	458.2	356.1
Equipment	41.3	42.8	21.5	19.5	9.9	4.1
Total Use	12474.7	9403.8	9426.5	9386.3	7161.3	7044.8

TABLE 3.--Age-Specific Utilization Per 1,000 PYE Eligible

(continued)

	10-14			15-21		
	1977	1978	1979	1977	1978	1979
Physician, ER, Clinics	2776.1	2488.5	2539.0	2625.2	2497.8	2524.9
Physician	2226.3	2018.0	2152.5	2058.5	1918.5	1930.4
Primary Care	1624.2	1553.0	1645.9	1343.9	1207.0	1335.6
Specialist	602.1	465.0	496.5	714.6	711.4	594.6
Emergency Room	406.5	353.4	282.3	388.6	332.6	305.3
Outpatient Dept.	28.7	29.8	16.0	15.0	57.3	58.2
Neighborhood Health Ctr.	114.7	87.4	98.1	163.0	189.4	231.0
Hospitalization	55.6	33.5	28.0	130.4	165.2	122.5
Dentist	843.3	805.3	744.9	814.9	742.3	707.1
Optician	288.4	266.0	243.3	198.1	193.8	148.6
Drug	1642.7	1510.2	1575.8	1757.6	1533.0	1474.0
Lab, X-ray	295.2	176.7	186.2	132.9	297.3	271.2
Other	571.7	412.8	404.5	401.1	304.1	397.7
Equipment	13.5	16.7	16.0	50.7	11.0	12.0
Total Use	6486.6	5709.8	5728.6	6368.5	5744.5	5658.5

TABLE 4

Utilization Per 1,000 PYE Eligible for Medicaid Only and Public Assistance

	Medicaid Only			Public Assistance		
	1977	1978	1979	1977	1978	1979
Physician, ER, Clinics	3083.6	2686.5	2911.4	3438.8	3050.7	3131.1
Physician	2505.1	2140.3	2422.0	2780.6	2457.9	2516.8
Primary Care	1878.8	1555.0	1852.7	2188.0	1956.6	2034.7
Specialist	626.3	585.2	569.3	592.6	501.3	482.1
Emergency Room	371.5	278.7	219.7	420.6	378.6	344.7
Outpatient Dept.	15.9	117.0	89.9	19.8	27.7	28.2
Neighborhood Health Ctr.	191.1	150.5	179.8	217.8	186.5	241.4
Hospitalization	169.8	144.9	189.6	104.7	94.9	92.2
Dentist	769.6	769.2	599.2	592.6	576.5	565.5
Optician	153.9	183.9	104.5	163.7	168.4	162.7
Drug	2441.4	1889.4	1797.7	2456.4	2037.4	2157.5
Lab, X-ray	276.0	228.5	249.7	260.2	201.2	197.9
Other	546.7	289.8	339.6	461.4	353.2	407.5
Equipment	42.4	16.7	25.0	26.5	19.2	11.7
Total Use	7483.4	6209.0	6217.2	7504.4	6501.6	6726.1

TABLE 5

Demographic Differences in Visits to Specific Hospitals

	Brunswick Center	Brookhaven Memorial	Central Suffolk	Eastern Long Island	Good Samaritan
Race	ER-Black INPT-Black	ER-White	ER-Over Black INPT-Black	ER-Over White INPT-White	ER-Over Black OPT-Over Black
Sex		ER-Female	ER-Female	ER-Male	ER-Male OPD-Female
Age			OPD-15-21 INPT-0-4	ER-0-4 yrs INPT 15-21	OPD-0-4 5-9
Case Type		ER-Medicaid only	ER-Medicaid only	ER-Medicaid only INPT-Medicaid only	ER-Medicaid only INPT-Medicaid only

TABLE 5.--Demographic Differences in Visits to Specific Hospitals

(continued)

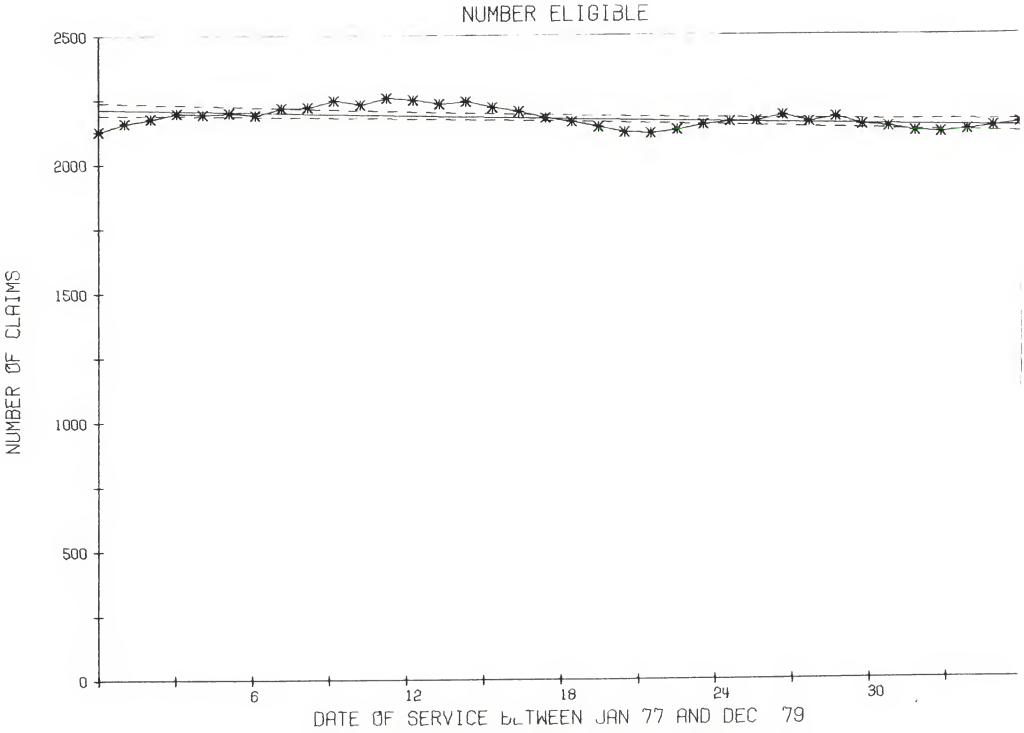
	Huntington	Lakeside	Mather	Nassau County Medical Center	St. Charles
Race	ER-Over Black, Latino INPT-White	ER-Over Black, Latino Over Black	ER-Over White INPT-Over White	INPT-Black	ER-Over White INPT-White
Sex	ER-Male		ER-Male	ER-Male	ER-Over White
Age	ER-10-14	ER 5-9	INPT 5-9 15-21	ER 10-14	
Case Type	INPT-Medicaid Only			OPD-Medicaid Only	ER-Medicaid Only INPT-Medicaid Only

TABLE 5.--Demographic Differences in Visits to Specific Hospitals

(continued)

	Smithtown	South Hampton	Southside	St. Johns Smithtown	LI Jewish Hillside	North Shore University
Race	ER-Over Latino INPT-Latino	ER-Over White INPT-White	ER-Over Latino INPT-Latino	ER-Over White INPT-White	OPD-Over White	OPD-Over Black
Sex						OPD-Female
Age		ER 15-21		ER 10-14	OPD 5-9 10-14	OPD 15-21
Case Type		ER Medicaid Only INPT Medicaid		INPT 5-9	INPT 10-14	

FIGURE 1


NUMBER ELIGIBLE
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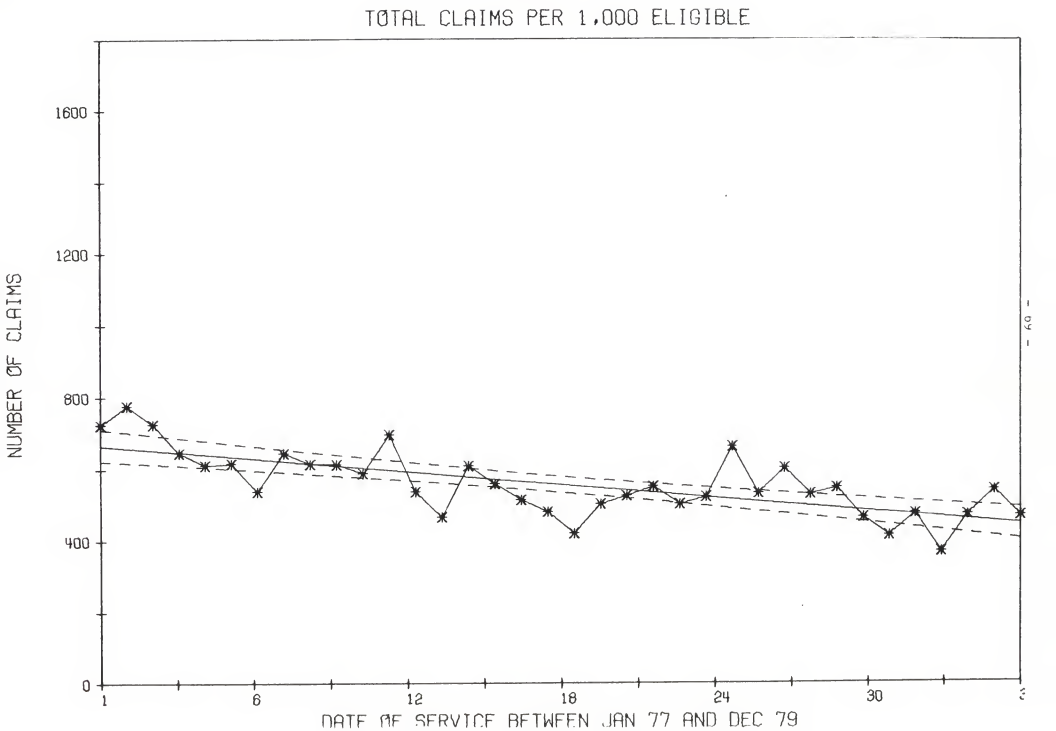
2000
1500
1000
500
0
NUMBER OF CLAIMS
6
12
18
24
30
DATE OF SERVICE BETWEEN JAN 77 AND DEC 79

FIGURE 2


TOTAL CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
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1200
800
400
0
1
6
12
18
24
30
DATE OF SERVICE BETWEEN JAN 77 AND DEC 79

Chapter Five

The Utilization of Medical Services by Medicaid Children

Since its inception, a major goal of the Medicaid program has been to increase the access of low income people to medical care. Although the utilization of services by low-income people has increased, it is not clear that the patterns of utilization of the poor are comparable to the non-poor, nor is it clear that the poor are receiving the same kinds of care as the non-poor. Earlier studies have described the exponential growth in the use of medical services. Many have discussed the extensive use of services, particularly by the poor, and some have assumed that much of it was inappropriate.

This chapter examines the use of health care services by children eligible for medical care. Since data were sampled on the basis of eligibility for services, two dimensions of utilization can be examined. Whether an individual uses a specific service is defined as use of service. The extent of utilization refers to the number of claims per year an individual makes. The chapter examines the utilization of clients, rather than sampling visits to a specific site. This analysis avoids the difficulties of visit-based utilization (Shepard & Neutra, 1977) by identifying individuals with high levels of utilization - who would be over represented in a visit sample -- and by also identifying individuals with low or no utilization.

Many Medicaid children do not use the services to which they are entitled. Twenty-three percent -- almost one of every four children in

the sample -- made no claim of any kind during the study period. Thirty-eight percent of the sample did not see an office-based physician. The high number of children with no use may include children eligible a short period of time who may not have had time to make claims. In order to eliminate that explanation, individuals eligible fewer than three months were removed from subsequent analyses of the use and extent of services. In particular, I will talk about rates of utilization, some determinants of utilization, and utilization by children with different regular sources of care.

The annual number of claims controlling for the number of months eligible was computed for the 3,734 children who had been eligible at least three months during the study period. Figure 1 shows the distribution of both the number of clients and the number of claims made by each group. The hollow bars represent the proportion of the sample who made the number of claims per year shown beneath the bar. For example, 15 percent of the sample made no claims, 10 percent of the sample made two or fewer claims, etc. The striped bars represent the proportion of all claims which the individuals represented by the adjacent bar made. Notice that a small proportion of the clients made a large number of claims; summing the two bars on the right shows that individuals making 16 or more claims per year represent only 13 percent of the population, but made 47 percent of all claims. Not all Medicaid-eligible children have this high level of use. Fifteen percent, a slightly higher proportion than had a high number of claims, made no claims at all. Forty-one percent of the sample made four or fewer claims per year, representing 7% of all claims made. The number of claims described

here represents not only claims to physicians, but also includes dental claims, lab work, drugs, and even transportation charges paid by Medicaid.

The use of physicians is particularly important, since physician care is seen as the "gateway" to health care. Figure 2 shows a small group with high utilization and a larger group with no use: 1.4 percent of the population made 13 percent of the visits to physicians, while 30.7 percent of the population did not visit an office-based physician.* Office-based physicians can be separated into primary care physicians and specialists. Pediatricians, general practitioners, family practitioners, general internists and osteopaths were defined as primary care providers and all other physicians were defined as specialists. Figure 3 shows that 36 percent of the children did not see a primary care physician during the study, while less than 9 percent of the sample made 31% of the visits. Nearly 70 percent of the sample did not see a specialist, while approximately 4 percent of the sample made 44 percent of the claims to specialists. The remaining graphs illustrate that a substantial proportion of the sample did not use services: approximately one-third did not make drug claims, over half did not see a dentist, two-thirds did not use an emergency room, and four-fifths did not make lab or x-ray claims, optical claims and were never hospitalized. A small group of individuals make a large proportion of the claims. One percent of the sample makes 16 percent of all emergency room claims, for example. These figures illustrate that the use of different services vary--

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* Note that each figure is independent. The scale of the graphs differ so that smaller groups are not ignored. The height of one bar is not directly comparable to the height of a bar on a different graph.

Survey indicates that 31 percent of the nation's children (and 36 percent of children in families with income under $5,000) made no ambulatory visits during that year, and people under 18 had an average 4.1 physician contacts per year (Health, 1978, p. 56-57). This indicates that slightly more Medicaid-eligible children in Suffolk County were seeing a physician in some setting, but that the average number of visits per child was slightly lower than the national average.

An automatic interaction detector (AID) was used to distinguish between high and low users. AID computes a series of one-way analyses of variance and splits the population into successive subgroups to maximize the between-group variation on the dependent variable. AID does not assume that the predictor variables are uncorrelated, linear, or that their effects are additive. Thus, it is particularly appropriate when exploring the relationships between variables in a large data base.

The analyses included two types of predictor variables, those related to the length and type of Medicaid eligibility and demographic variables, and two dependent variables, USE, and EXTENT. Eligibility factors are highly related to whether a person uses services. Figure 11 shows the clustering of variables that differentiate between users and non-users. The means indicate the proportion making claims. Individuals who were eligible less than 8 months were less likely to use services than those eligible for longer periods. Among those eligible over eight months, children under three were more likely to use services. Among those less likely to use services, the number of months of consecutive eligibility affected the use of services,

people are most likely to visit physicians, particularly primary care physicians and have drug claims, while individuals are least likely to use opticians, lab and x-ray services, or to be hospitalized. The emergency room and specialist physicians are in the mid range, with one-third of the sample using them. The figures also indicate that a few individuals make extensive use of the services.

Nine percent of the sample, or one-third of those who did not use a physician, emergency room, or clinic did use other kinds of services. Of those 300 children who used services other than physicians, ERs, and clinics, 60 percent saw dentists, 34 percent made drug claims, 17 percent saw opticians, and 9 percent were hospitalized. Table 1 shows the proportion of individuals making those claims and the annual number of claims per year to that provider. Children seeing dentists made an average of 2.0 visits per year. The 34 percent making drug claims made an average of 2.6 drug claims per year. Drug claims may have been made for non-prescription items or may have resulted from physician visits prior to the study. Very few children (.7%) made institution claims, but those children make an average of 13 claims per year.

The median number of claims is an indication of the extent of use. The median number of all claims per year was 5.1. The sample made a median 2.9 visits per year to office-based physicians. Medicaid claims may also see physicians in institutional settings. Combining the number of claims to office-based physicians, emergency rooms, and clinics indicates that 24 percent of the sample did not visit any of these sources of care. The mean number of annual claims to the three sources of primary care combined was 3.7. In contrast, data from the 1974 Health Interview

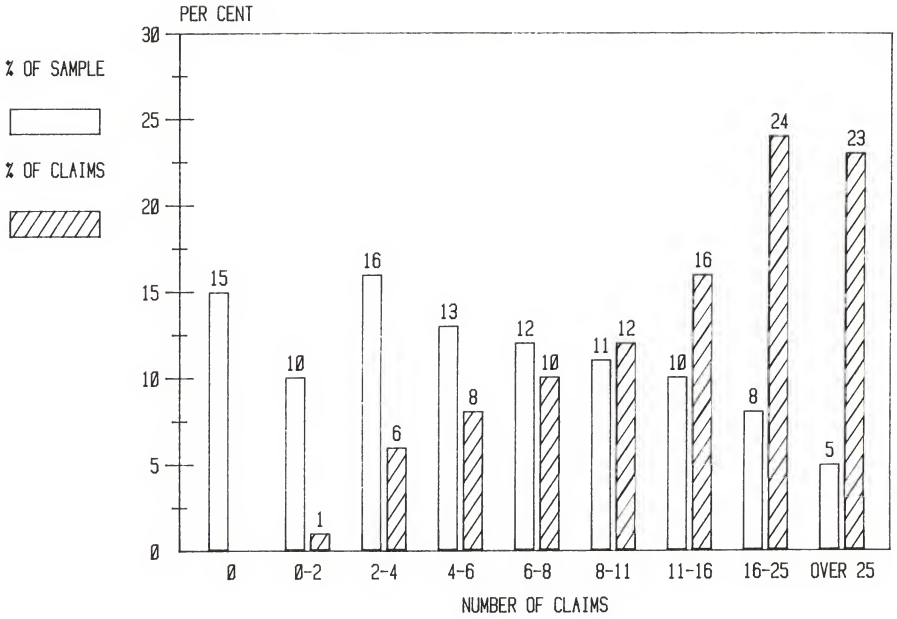
with individuals with more continuous eligibility more likely to make claims. Age again was the next most important variable, with younger children more likely to make claims than older children. Thus, it appears that the length of eligibility is the most important variable in explaining whether any services are used at all. Among those more likely to use services, age affects the likelihood of use; among those less likely to utilize services consecutive eligibility and age affect whether an individual uses services.

A second AID examined the extent, or amount of utilization of services. Demographic variables discriminate most clearly between levels of use. The means reported in Figure 12 are the annual number of claims per child. The most important variable is age: children under 5 average two more claims per year than older children. Race affects the extent of utilization in both branches, with Whites and Latinos making more claims than Blacks. Among the older children, adolescents make fewer claims than grade-school aged children and girls make more claims than boys. Thus, we find that age and race are the most important variables determining the amount of use, with sex a factor among older children. It appears that there is a two-step process, where eligibility factors affect whether an individual utilizes services provided by Medicaid, and demographic factors affect the extent of that use.

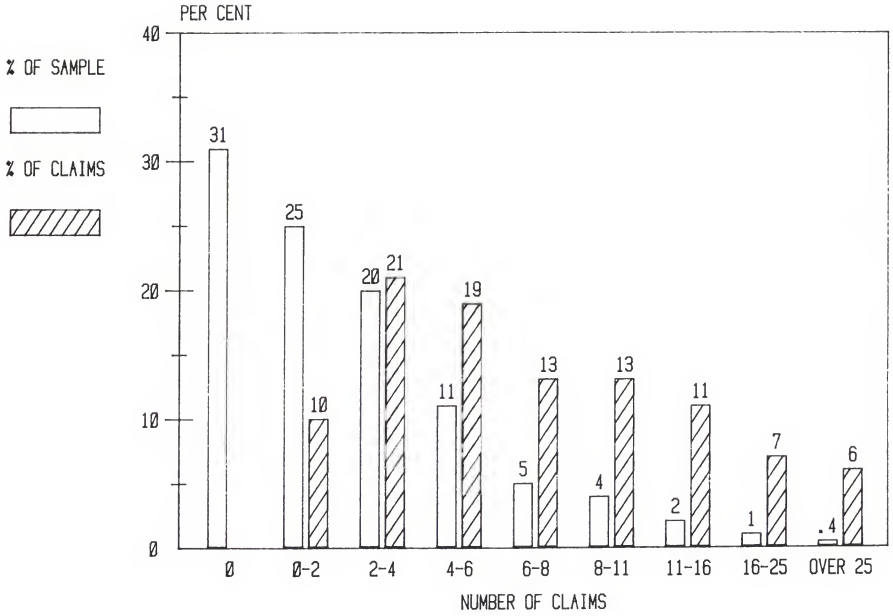
In sum, we see that Medicaid-eligible children are as likely to see a physician in a year as are non-Medicaid children. Among Medicaid children, the length and continuity of eligibility affect the likelihood of making use of services. At the same time, Medicaid eligible children see physicians

less often than the national average. Children under 5, and White and Latino children see physicians more frequently. Thus, we conclude that while Medicaid has increased access (and use) of medical care to a proportion of children comparable with the national average, it has not changed the pattern of care-seeking behavior.

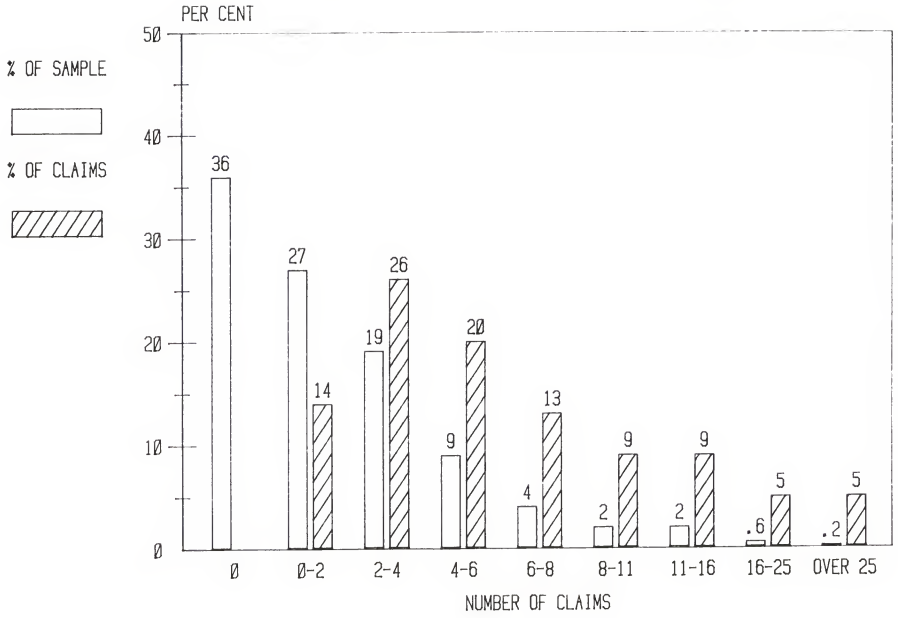
MEDICAID UTILIZATION



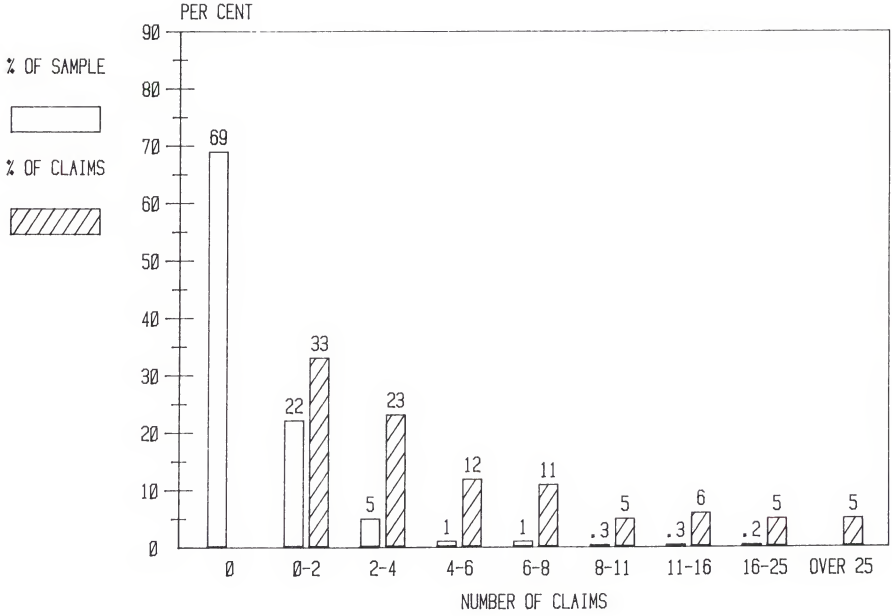
USE OF PHYSICIANS



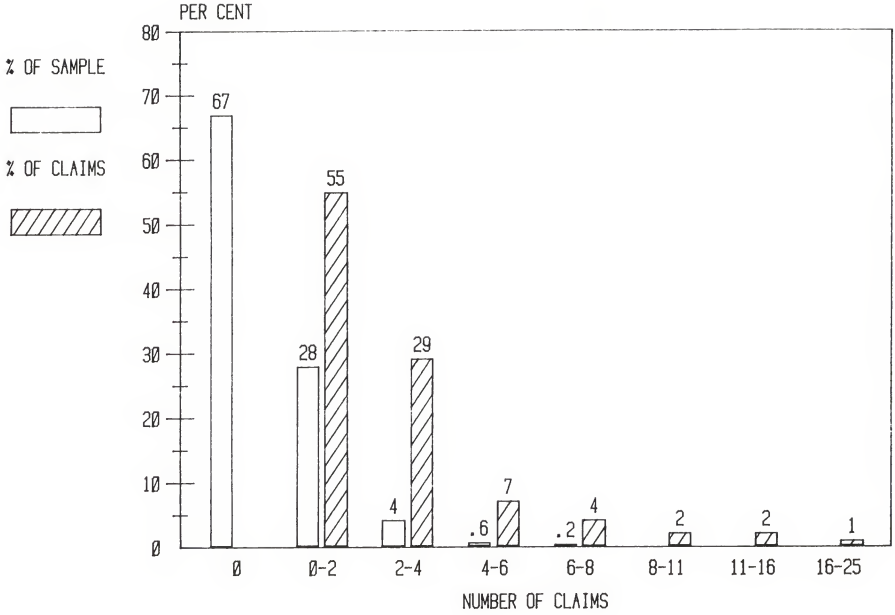
USE OF PRIMARY CARE PHYSICIANS



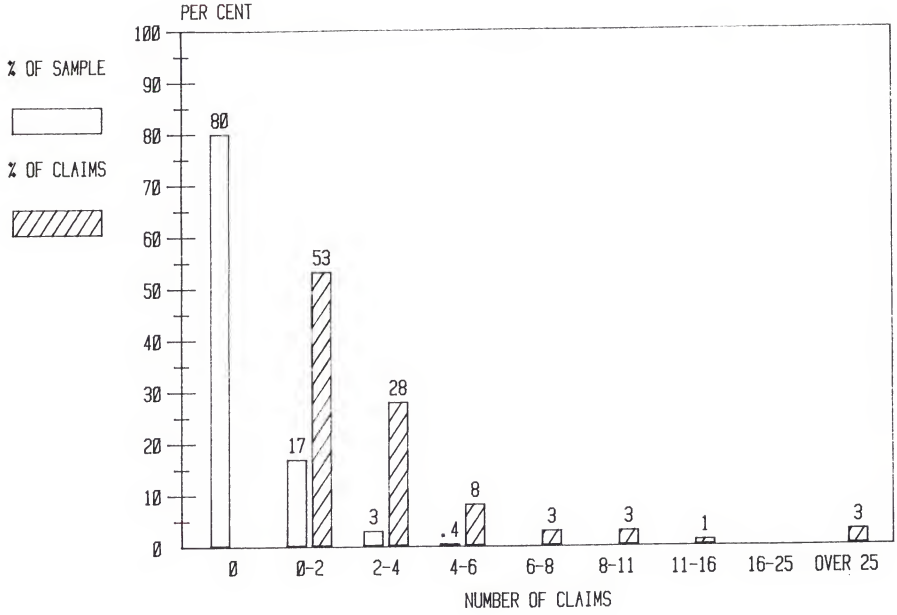
USE OF SPECIALISTS



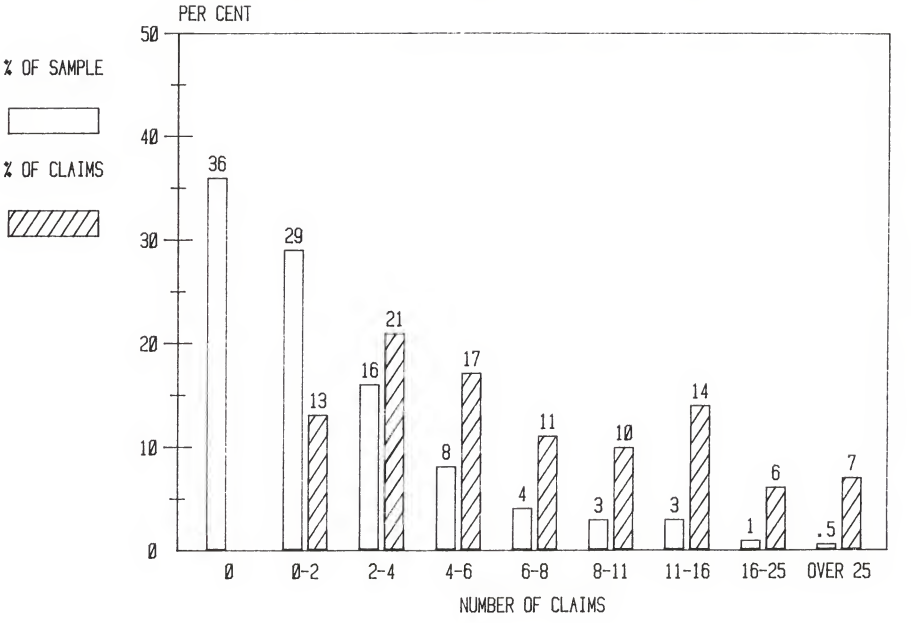
USE OF EMERGENCY ROOMS



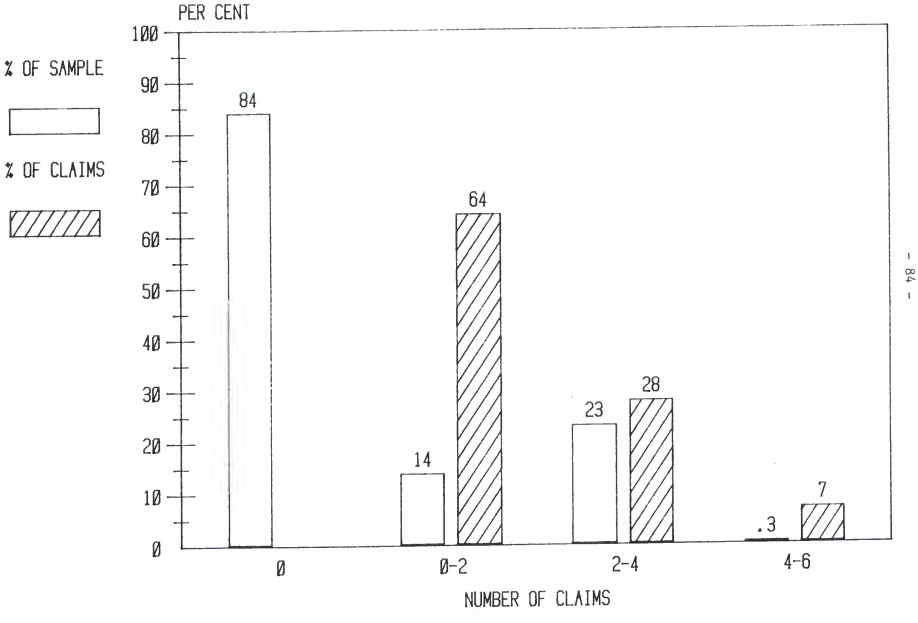
USE OF LAB AND X-RAY



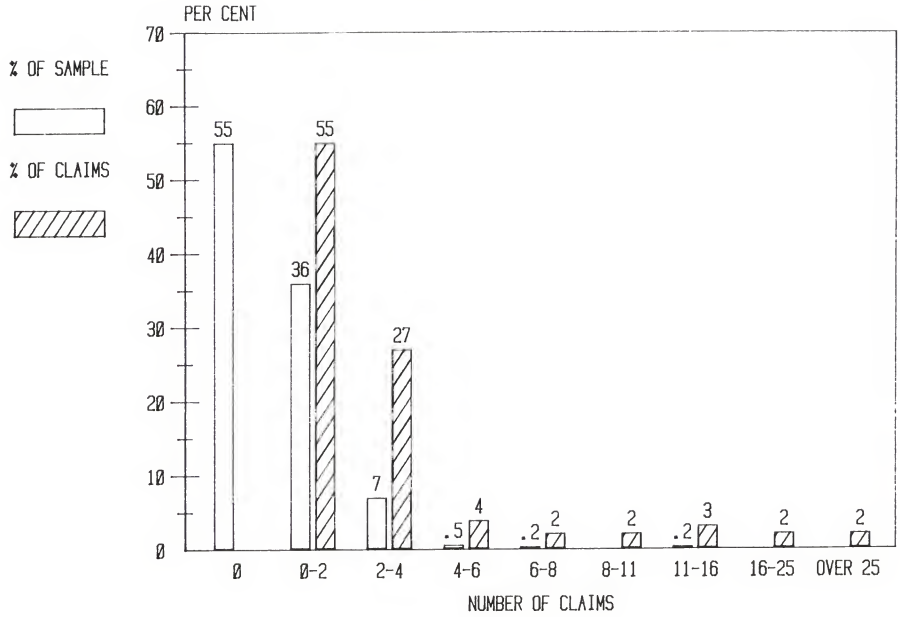
USE OF DRUG AND SICK ROOM SUPPLIES



HOSPITALIZATIONS



USE OF DENTAL CARE



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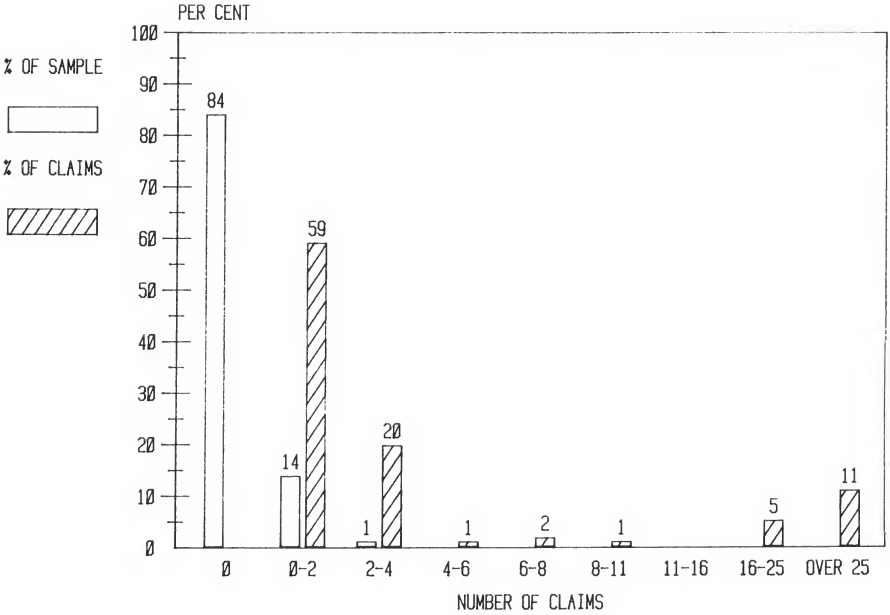
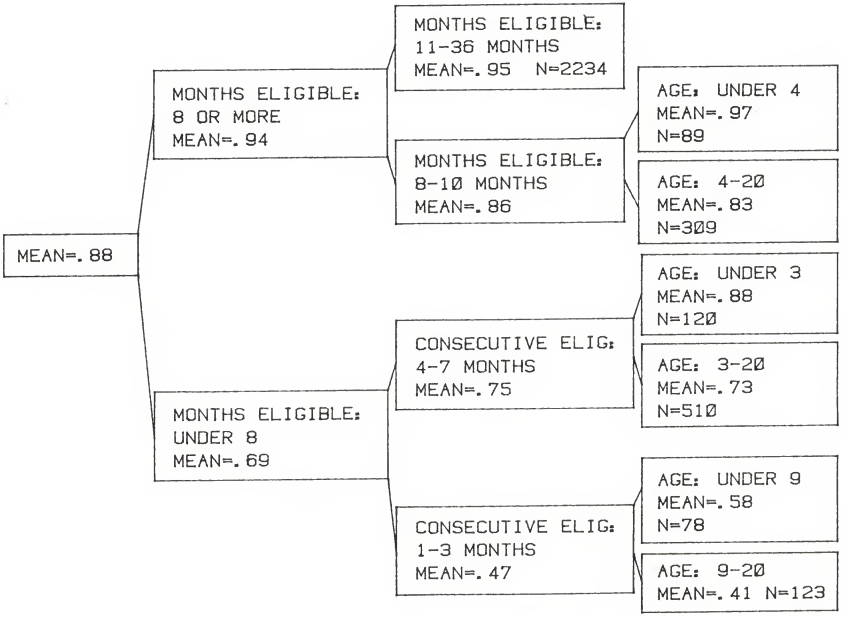
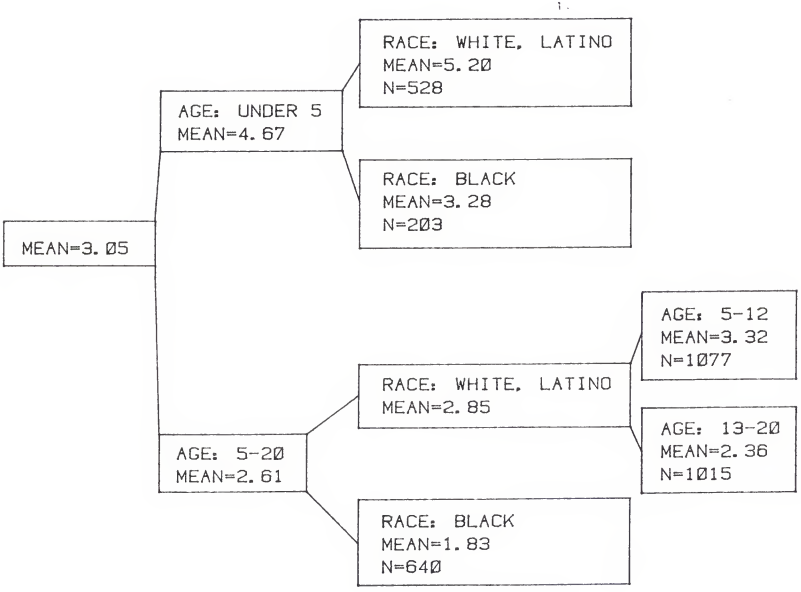


UTILIZATION OF MEDICAID SERVICES



EXTENT OF PHYSICIAN UTILIZATION



Chapter Six

Utilization of Emergency Services by Medicaid Children

Since its inception, a major goal of the Medicaid program has been to increase the access of low income people to medical care. Although the utilization of services by low income people has indeed increased, the poor may be using services differently and may be using different sources of care than the non-poor. It appears, for example, that the poor use emergency room services frequently, and observers might suspect that much of that use is inappropriate on clinical grounds. After a brief introductory section on their overall utilization, this chapter focuses on the ER utilization of the sample of Suffolk County Medicaid children.

Emergency room (ER) utilization has long been a topic of concern for health services researchers. The growth of ER use has been widely documented and has prompted substantial research describing who makes ER visits and categorizing the visits. In addition, some research has focused on the role of ER visits in a client's health care pattern. Many note that the poor frequently use the ER for non-emergent conditions and that the ER becomes a source of primary care for the poor. Two explanations can be offered for non-emergent ER visits (Davidson, 1978). The first defines that use as inappropriate and usually examines characteristics of the clients making those visits. The second explanation notes that non-emergent ER use may be attributable to the unavailability of office-based physicians. A variant of this explanation argues that non-emergent use of the ER serves as a safety valve for office-based practices; that is, office-based physicians are unable or unwilling to provide all the needed non-emergent care and the emergency room functions as a substitute for office-based care (Hilker, 1978).

Most studies of emergency room use have relied on samples of ER visits, but differences in the frequency of visits by different groups of the population could cause inaccurate inferences about the population using emergency rooms. This chapter examines emergency room use by children eligible for Medicaid, compares frequent and infrequent ER users, and considers the extent of ER use which might be classified as inappropriate and the frequency with which ER use is substituted for office-based care.

Emergency room utilization can be analyzed at both the client and the visit level of analysis. Questions related to characteristics of the visit--the season, day of week, reason for visit--are best analyzed at the visit level. Questions about people who use the ER and the prevalence of ER use can best be discussed at the client level, which permits identification of individuals with low or no utilization. This chapter reports analyses conducted at both visit and client levels, and specifies the level of different analysis.

Since children in the sample were eligible for different lengths of time, those who were eligible for only a brief period and, thus, had limited opportunity to use services, may inflate the estimated rates of utilization. Individuals eligible for fewer than three months, therefore, were removed from the analysis presented here, and much of the analysis is based on person-years of eligibility.

Utilization in General

It turns out that many Medicaid children do not use services to which they are entitled. Fifteen percent of the children eligible for three months or more made no claims of any kind during the entire

three-month period.[1] Figure 1 shows the distribution of both the number of clients and the number of claims of any kind made by each group. The hollow bars represent the proportion of the sample who made the annualized number of claims shown beneath the bar. For example, 15% of the sample made no claims, 10% of the sample made two or fewer claims, etc. The striped bars represent the proportion of all claims made by individuals represented by the adjacent bar. Notice that a small proportion of the clients made a large number of claims; summing the two bars on the right shows that individuals with 16 or more claims per year represented only 13% of the population, but made 47% of all claims. One policy-relevant question to be asked -- but which unfortunately cannot be answered here -- is to what extent can a successful cost containment strategy focus on those 13% of eligibles?

It is often said that primary care ambulatory services are critical both to understanding utilization patterns and to cost-containment efforts since it is the primary care physician who is the gatekeeper to most other medical care services. Focusing on outpatient services -- which we are not able to separate into primary and non-primary care services -- we see in Table 1 that 58% of the children visited an office-based physician during the study period and more than one-quarter of the children used the services in a hospital emergency department. Further, almost 36% used no ambulatory services at all. When it is

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[1] To illustrate the previous point that including those eligible for brief periods inflates the rates, when all children eligible at any point during the three years were included, the proportion of nonusers increased to 23%, almost one of every four children. This phenomenon also suggests that reports of utilization rates for Medicaid patients should be examined carefully to determine if all eligibles are included in the demonstration.

remembered that only 17% used no services of any kind, we can observe that as many as 21% used other services without seeing a physician during that three-year period.[2]

The Prevalence of ER Use

Few studies have examined the prevalence of ER use by a Medicaid population. Some found that Medicaid clients were overrepresented among ER users and were more likely to use the emergency room for non-emergent problems, and they have assumed that most Medicaid clients make extensive use of the emergency room.

In view of this background, it came as something of a surprise, therefore, to find (Figure 2) that utilization of the emergency department was not a common practice among Medicaid children in Suffolk County. Only one-third of the children eligible for three months or more visited any emergency room at all. During the three-year study period, 1,234 children made 2,371 emergency room visits, an average of 1.28 ER visits per year of eligibility. Thus, the majority of children eligible for Medicaid made no use of the emergency room at all, and of those who did, most made relatively few annualized visits.

Since the poor frequently use the emergency room for non-emergent conditions, we may assume that the emergency room functions as the main sources of care for many. However, 95% of the Medicaid children making emergency room visits also saw an office-based physician at some time

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[2]Of the children not using any of these ambulatory services, 60% saw a dentist, 34% used drugs, 17% visited an optician, and 9% were hospitalized. It should be noted that some of the children might have seen a physician before the three-year study period began and were following his recommendations -- for referral, drugs, hospitalization, tests -- during the study period.

during the study period. Only one percent of the children using the ER used no other source of care. This supports the findings of Solon and Rigg (1972) that even for patients of an inner-city emergency room the ER occupies a peripheral component of the patient's health care.

Frequency of Visits

Like most patients and most services, the frequency of emergency room use among Medicaid eligible children also varies widely. Moreover, it may be that frequent ER users differ from infrequent users in important ways. Ullman and his colleagues (1975) compared frequent and infrequent users of a particular ER and found differences in their demographic characteristics, in the types of visits they made to the ER, and in their use of other hospital-based services, such as outpatient clinics. Using three visit-frequency groups, they found that 79% of their sample made one or fewer visits per year, 13% made more than one but less than three, and 8% made 3 or more ER visits in a year.

They also compared the visit-frequency groups and found that a disproportionately high proportion of Black, low income, and inner city residents were frequent ER users, and that a small proportion of their visits were for accidental injury. Using similar categories for frequency of ER use, we found that 60% of Medicaid-eligible children who used the emergency department made one or fewer visits per year of eligibility. The number of emergency room visits per child was computed by adjusting for the number of months of eligibility. For example, a child making one emergency room visit during 36 months of eligibility would be counted as having .33 ER visits per year. Fewer Medicaid children fell into the infrequent ER use category than Ullman found in his study of a general population. However, the proportion of individuals classified as

frequent users was only slightly larger among the sample of Medicaid children. More Medicaid children fell into the moderate ER use category than Ullman found in his study. While the average number of ER claims, 1.28, was similar to the average 1.36 ER visits Ullman found, more Medicaid children made a moderate number of ER claims, while slightly more made frequent ER visits.

Frequent and infrequent ER users differed significantly in age and eligibility category (see Table 2). Young children were more likely to be heavier users, while those age five and older were more likely to be infrequent users of ER services ($p < .001$). Further, children who were eligible for medical assistance only (MAO) were more likely to be moderate or frequent users of ER visits while those eligible for cash grants were more likely to be infrequent users ($p < .006$). No significant differences were observed by sex, race, the presence of supplemental insurance, or township of residence. These findings differ from Ullman's, which found racial but not age differences. The divergence probably reflects differences in the two samples: Ullman's consisted of ER visits made by all age and income groups to a single emergency department, while the present study focused only on children and included several emergency departments.

Reasons for Visit

Much research on ER utilization argues that a large proportion of visits are for conditions which could be treated in another, more appropriate, setting. The Suffolk County data base can test this assertion in a limited way since the data base categorized and the visits in general terms like acute illness, acute followup, injury, and chronic-acute episode, among others. While we lacked measures of

severity and precise diagnosis, we assumed that most acute illnesses could be treated in another setting and that visits for injuries were more likely to be appropriate uses of the ER. Given those assumptions, we also expected that frequent ER users made more non-injury claims and more ER visits on weekdays and during holiday periods. Since we were interested in characteristics of the ER visit, this analysis was performed at the visit level.

The two most common reasons for ER visits for all three visit-frequency groups were acute new illnesses and injuries, but the distributions showed that frequent users were more likely than infrequent users to visit the ER for acute illnesses than for injuries ($p < .001$). Frequent and infrequent ER utilizers did not visit the ER at different times of day, on different days of the week, nor in different seasons of the year.

As noted above, limitations in the data prevent us from commenting definitively on the appropriateness of these patterns, but it is not unreasonable to assume that an emergency department is more likely to be the appropriate site of care for an injury than for an illness. If that presumption is correct and most acute illnesses can be treated effectively in a physician's office -- at a significant dollar savings per visit -- then it is also reasonable to assume that policies which aimed at increasing the accessibility of office-based physicians to Medicaid patients could result in non-trivial amounts of dollar savings.[3] This is not a particularly new idea, but the findings do provide some

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[3]This also assumes substitution of an office-based physician visit for an emergency department visit and no additional services. To the extent that additional ancillary services, more visits, or referrals to specialists occurred, the savings would be reduced.

evidence that, in fact, it should be the case (Davidson, 1980).

Use of Other Services by Users of the ER

Frequent and infrequent ER users may differ in their use of other services as well. Ullman, for example, found that frequent ER users also made more use of other hospital-based services, including outpatient clinics, than did infrequent ER users. Analysis of covariance was employed to compare the use of other services by frequent, moderate, and infrequent ER users. Since the distribution of total claims and specific kinds of claims are highly skewed, the dependent variables and the covariate, number of claims, were transformed by taking the square root of the sum of the count plus .5, as recommended by Meyers (1972).

The results show that, indeed, frequent users of the ER also made heavy use of other kinds of services. Frequent ER users had the highest absolute numbers of claims (Table 4) and expenditures (Table 5) for physician services, drugs, laboratory tests, and hospitalizations. After adjusting for the total number of claims per year, however, infrequent users had the highest number and cost of physician visits, drug claims, and lab claims ($p < .001$) (Tables 6 & 7). Frequent ER users had the highest number and cost of hospitalizations and the highest total cost even controlling for the total number of claims. The data are, therefore, consistent with the view that, to some degree, the ER is indeed a substitute for the office-based physician.[4]

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[4]Additional support for the substitution hypothesis can be found in the fact that the ER is more likely to be used at times when office-based physicians are unavailable. Chi square analysis indicates that more physician visits occur in non-summer months and a greater proportion of ER visits occur during summer months ($p < .001$). Similarly, a greater proportion of physician visits occur on Mondays and Fridays, while a larger percentage of ER claims are for Saturday and Sunday ($p < .001$) when the physician is less likely to be in his office.

Moreover, to the extent this conclusion holds, it represents a pattern for cost-conscious policymakers to want to change because visits to the ER not only are more expensive than those to a doctor's office, but also, as shown here, are associated with costly hospitalization.[5]

It is not clear on the basis of the available evidence, however, what interpretation to give to these findings. It may be that frequent use of the ER signifies fragmented care and that the higher numbers and costs of other services could be reduced if the patient had a physician to act as a case manager or gatekeeper to other services for him. On the other hand, having a regular physician may encourage people to use more services than they need and, thus, may lead to more physician visits than are necessary (Aday, Andersen, and Fleming, 1980). For the latter group, visits to the ER occur only in a true emergency or when the regular physician was unavailable. Nonetheless, and even without being able to say whether the extensive use of office-based physicians by this latter group represents overuse or unnecessary services, theirs may still be the preferred pattern from a public policy viewpoint. That conclusion is justified since frequent ER users, who may be assumed to have no such relationship with a private physician, have the highest number of hospitalizations and outpatient department claims and account for the greatest expenditures. Clearly, however, these are questions which require further exploration; and for a complete answer, the analysis must include the two-thirds of Medicaid children who did not use the ER at all.

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[5]Hospital use may be reduced if, in marginal instances, the ER physician is more likely to admit a patient than the office-based physician. This may be the case because of the ease or convenience of hospitalization for the ER physician, his greater awareness of low occupancy rates and/or pressure on him to raise them, or simply the absence of the barriers to hospitalization (e.g. distance, transportation, time) which face office-based physicians and their patients.

Summary

In sum, only one-third of the children eligible for Medicaid used the emergency room, and those who did, varied greatly in the numbers of visits made. Three-fifths of those who did use the ER made no more than one visit per year of eligibility; and about 10% of ER users (3% of the entire sample) accounted for three or more claims per year and 19% of all ER claims. This small number of frequent ER users had more hospitalizations and higher costs than those who used emergency departments less frequently.

The data offer evidence to suggest that the high users of emergency department services do not have a regular office-based physician to care for them and that if some of their utilization could be diverted from the ER to a physician's office, the Medicaid program might be able to contain its expenditures to some degree. Further analysis of these data may help to sharpen the retrospective utilization picture of these patients, and the prospective demonstration funded last year by HCFA may remove the remaining uncertainty about the value of continuing care for children.

TABLE 1

Use of Outpatient Services
by Medicaid Children

Type	Visits		Children	
	#	%	#	%
M.D.	16,231	80.4	2,634	58.2
Outpt. Dept.	159	1.0	57	1.2
NHC	1,362	6.8	462	10.2
ER	2,387	11.8	1,245	27.5
No Use	--	--	1,614	35.7
TOTAL	20,195		4,525*	

* Children can use more than one type of care, so numbers do not sum up to 100%.

TABLE 2

CLIENT CHARACTERISTICS AND FREQUENCY OF ER USE

	Number of ER Visits Per Year of Eligibility			
	0.1-1.0	1.1-2.9	3 or More	Significance
Age				
0 - 4	15.5%	34.5%	33.3%	
5 - 9	29.3	19.1	25.2	
10 -14	25.9	20.6	20.7	
15 -21	29.2	25.8	20.7	$p < .001$
Race				
Black	28.7	27.5	23.6	
White	57.3	63.4	64.5	
Latino	14.0	9.2	11.8	N.S.
Sex				
Male	53.1	45.4	49.5	
Female	46.9	54.6	50.5	N.S.
Eligibility				
MA Only	8.1	13.6	14.4	
PA	91.9	86.4	85.6	$p = .006$
Township				
Babylon	21.5	19.9	18.2	
Brookhaven	32.2	31.2	37.3	
Islip	28.3	27.2	21.8	N.S.
Riverhead	5.6	8.9	12.7	
Others	12.0	12.8	10.0	
N	740	382	110	
(ER Users)	60%	31%	9%	
(of All Children)	16.4%	8.4%	2.4%	

TABLE 3

Reason for ER Visit
by Frequency of ER Visits

	Number of ER Visits/Year		
	.1-1.0	1.1-2.9	3.0 or more
Acute New Illness	47.0%	57.5%	72.0%
Injury	51.5	40.6	25.3
Other	1.4	1.9	2.6
N =	961	971	442

$p < .001$

TABLE 4

Unadjusted Number of Selected
Other Services by Frequency of ER Use

	Physician Claims	Outpatient Dept. Claims	Drug Claims	Lab Claims	Hospitalizations	N
Grand Mean	1.89	.73	1.78	.86	.81	
Deviations from the Mean						
Infrequent Users	-.16	.00	-.18	-.02	-.04	740
Moderate Users	.09	-.01	.13	.02	.04	383
Frequent Users	.74	.04	.77	.09	.14	111
p	.001	.031	.001	.001	.001	

TABLE 5

Unadjusted Cost of Selected Services
by Frequency of ER Use

	Physician Costs	Drug Costs	Lab Costs	Hospitalization Costs	Total Costs	N
Grand Mean	$7.37	$3.88	$1.61	$5.29	$16.51	
Deviations from the Mean						
Infrequent Users	-.87	-.49	-.07	-1.62	-2.97	740
Moderate Users	.52	.39	.02	1.35	1.20	383
Frequent Users	3.96	1.91	.41	6.14	13.27	111
p	.001	.001	.001	.001	.001	

TABLE 6

Number of Selected Other Services by
Frequency of Emergency Room Use
Adjusted for Total Number of Claims

	Physician Claims	Outpatient Dept. Claims	Drug Claims	Lab Claims	Hospitalizations	N
Grand Mean	1.89	.73	1.78	.86	.81	
Deviations from the Mean						
Infrequent Users	.09	.00	.07	.03	-.02	740
Moderate Users	-.06	-.01	-.03	-.02	.02	383
Frequent Users	-.40	.04	-.36	-.14	.04	111
Significance	.001	.031	.001	.001	.001	

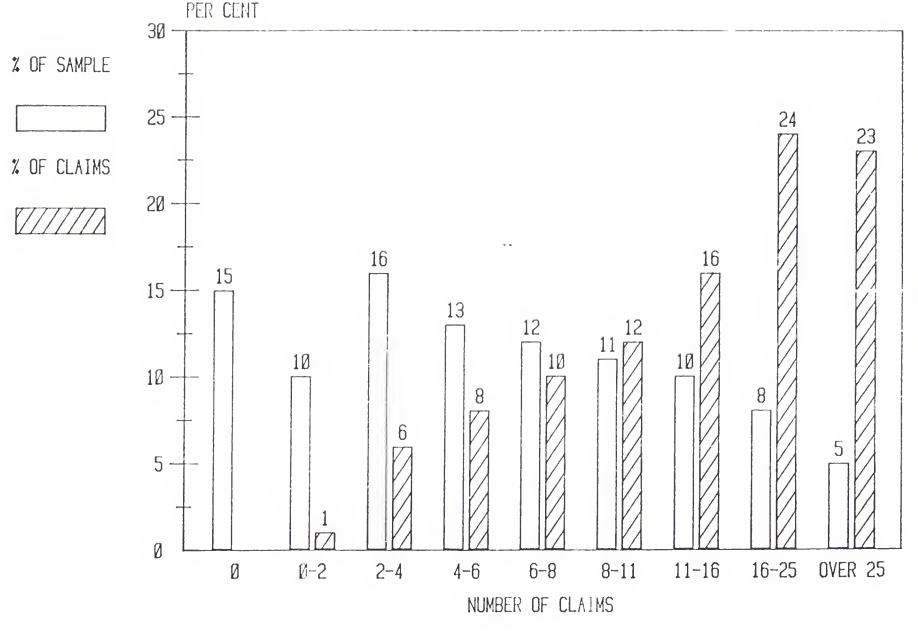
TABLE 7

Cost of Selected Other Services by
Frequency of Emergency Room Use
Adjusted for Total Number of Claims

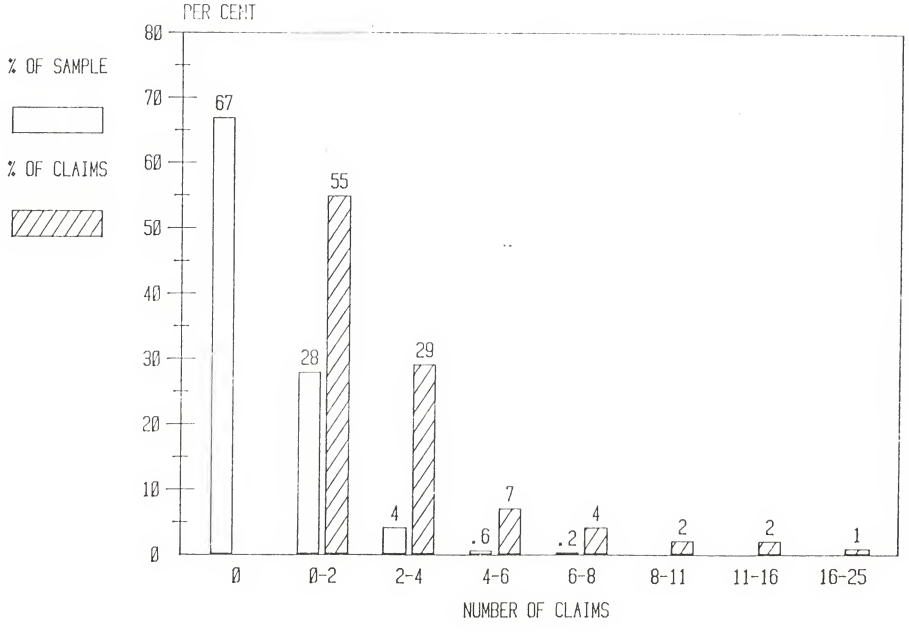
	Physician Cost	Drug Cost	Lab Cost	Hospitalization Cost	Total Cost	N
Grand Mean	$7.37	$3.88	$1.61	$5.29	$16.51	
Deviations from the Mean						
Infrequent Users	.40	.19	.21	-.83	-1.10	740
Moderate Users	-.24	-.02	-.15	.87	.76	383
Frequent Users	-1.81	-1.18	-.87	2.53	4.70	111
Significance	.001	.001	.001	.001	.001	

FIGURE 1

MEDICAID UTILIZATION



USE OF EMERGENCY ROOMS



Chapter Seven

Utilization of Office Based Physicians

The impact of Medicaid on access to health care is frequently measured by the number of physician visits the poor make. Over the years the volume of physician visits for Medicaid patients has become quite similar to that of non-Medicaid patients (Okada & Wan, 1980, Rabin & Schach, 1975; Rabin, Bice & Starfield, 1974), if not somewhat higher (Butler & Scotch, 1978). Rabin and Schach (1975) and Davis (1976) note that, along with the presence of the program itself, higher morbidity among the poor may be part of the explanation for Medicaid patients' higher rates of utilization.

Physician visits can be made in several settings -- a hospital clinic, emergency room (ER), neighborhood health center, or an office-based practice. The hospital clinic and ER were inappropriate and inefficient sources of primary care since it can be provided equally well at less cost in physicians' offices. Moreover, in hospitals care tends to be more fragmented and episodic (Okada & Wan, 1980). Roghmann (1971) and David (1976) found that in spite of increases in the volume of physician visits, Medicaid patients, in contrast to other groups, receive a disproportionate share of that care in institutional settings. The use of office-based physicians, then, may be seen as an indicator of the degree to which Medicaid children have attained equity in health care. This chapter considers three aspects of Medicaid children's use of office-based physician services -- which physician specialties are most commonly seen, how often are those physicians seen, and which children see them.

Most data about the utilization of different physician specialties such as the NAMCS[1] data, has been collected at the visit level of analysis. Since visit level data can be distorted by a few patients who are high users (Shepard & Neutra, 1977), the utilization of various physician specialties was analyzed at the client level. Chapter 2 discusses the advantages and disadvantages of these levels of analysis in further detail.

In addition to considering the utilization of specific physician specialties, we grouped physicians as either "primary care" physicians or specialists. Primary care physicians include pediatricians, general practitioners, family practitioners, general internists, and osteopaths. Specialists include pediatric specialists, neurologists, gynecologists, urologists, surgeons, dermatologists, otolaryngologists, and ophthalmologists.

In order to put the utilization of various physician specialties in context, note that 38% of the children in our sample did not see any office-based physician during the entire three-year study period. Figure 1 shows the use of office-based physicians including the proportion of clients who had no contact with them. Twenty-three percent of the sample saw a combination of both primary care physicians and specialists, 6% saw primary care physicians only, and 5% saw specialists. Twenty-eight percent saw a single primary care provider: 18% saw pediatricians, 4% saw general practitioners, 4% saw family practitioners, 1% saw general internists and 1% saw osteopaths. Chi square analyses compared children who saw an office-based physician with those who did not. Latinos ($p<.001$), children age 9 and younger ($p<.001$), females ($p=.003$), chil-

[1] National Ambulatory Medical Care Survey.

dren with no private insurance ($p<.001$) and children eligible for public assistance ($p<.001$) were disproportionately represented among those using office-based physicians. On the other hand, youth age 15-21, males, those eligible for Medicaid only and whites were underrepresented among those seeing an office based physician (see Table 1). Thus, a large proportion of children did not see an office-based physician and, among those who did, the most common pattern was to see more than one kind of physician. Subsequent analyses in this chapter examine the 2,634 children who did see an office-based physician during the study period.

Demographic characteristics of children using physician specialties

Chi square analyses were used to compare the demographic and eligibility characteristics of children visiting a specific physician specialty and those visiting other physicians. It is important to determine whether different populations visit different physician specialties because if some result in unnecessary expenses, then differences may contain clues to new policies which could result in more appropriate utilization patterns. A separate analysis was done for each physician specialty since a child may have had more than one type of physician. Table 2 summarizes demographic differences in use of physician specialties. Regarding racial differences, for example, family practitioners ($p=.009$), internists ($p<.001$), internal medicine specialists ($p=.027$), surgeons ($p=.017$), and otolaryngologists ($p<.001$) saw disproportionately more White Medicaid youth. Ophthalmologists saw more Latino and White youth ($p<.001$) while general practitioners ($p<.001$) saw more Latino and Black youth than Whites. Finally, osteopaths saw a higher proportion of Black

youth than would be expected ($p < .001$). No significant racial differences were observed in the patients of other physician specialties.

General practitioners and osteopaths are more likely to see Black Medicaid patients than other physicians perhaps because they are at a disadvantage in the competition for more favored higher income patients, who tend to be White. At the same time, family practitioners, internists and otolaryngologists may be more prestigious specialties and can attract more desirable patients or may be located in White neighborhoods. Further research is needed to examine the geographic distribution of various physician specialties and their ability to attract desirable clients.

The child's age also affects the use of different physician specialties. Pediatricians ($p < .001$), and pediatric specialists ($p < .001$) see more children age 9 and younger than older children. Otolaryngologists ($p < .001$) and ophthalmologists ($p < .001$) see more youth between the ages of 5 and 14. Other physician specialties see more children age 10 and older. General practitioners ($p < .001$), family practitioners ($p < .001$), internal medicine specialists ($p = .003$), neurologists ($p = .001$), surgeons ($p < .001$), and dermatologists ($p < .001$) see more youth 10 and older. Internists ($p < .001$) and gynecologists ($p < .001$) see more youth age 15 and older. The age differences in the use of the several physician specialties may reflect the kinds of problems children have at different ages or the transition from one type of physician to another as a child matures. Young children see pediatricians, while older youth see internists or specialists.

There are few sex or eligibility differences in children seeing different physician specialties. Neurologists ($p = .035$), pediatric

specialists (p=.029) and urologists (p=.041) see a disproportionately higher proportion of males, while obviously gynecologists see females (p=.002). Data about private insurance and type of assistance were recorded for as many as four eligibility periods for each client. Two other variables were created from that information: whether the individual had ever had any insurance during the four periods, and type of eligibility, a trichotomy describing whether the individual was always eligible for MAO, eligible for MAO part of the time, or was always eligible for cash assistance as well as medical assistance. For the most part, whether an individual had private insurance and the eligibility type were not significantly related to the use of different physician specialties. General practitioners (p=.008) and family practitioners ($p<.001$) were more likely to see individuals who were always eligible as cash recipients. General practitioners were more likely than other practitioners to see individuals who had never had private health insurance (p=.017).

The frequency of physician use

While the first section considered which children used different physician specialties, this section considers their frequency of use. Table 3 shows the number of individuals who used different physician specialties and the average rate of claims per year to that specialty. It indicates that the three most frequently used physicians are primary care physicians. Pediatricians are the physicians most likely to see children in the sample; slightly over half of those individuals making claims to a physician saw a pediatrician. The next most commonly visited physicians were family practitioners and general practitioners, who saw

approximately one-fourth and one-fifth of those visiting physicians, respectively. Surgeons and ophthalmologists each saw approximately one-tenth of the people using physicians. Other primary care physicians, general internists and osteopaths, saw smaller proportions of the children using physicians.

While pediatricians, family practitioners, and general practitioners all saw relatively large proportions of clients, the rate of visits per year differed among them. Children seeing pediatricians made an average of 4.1 visits per year to pediatricians (though not necessarily to the same pediatrician) while children seeing family practitioners made an average of 2.7 visits per year, and those seeing general practitioners made an average of 2.0 visits per year.

Age differences may explain in part the difference in average number of visits per year. For example, younger children generally make more visits to physicians and also are more likely to see a pediatrician. In order to more accurately compare the average number of visits per patient to different kinds of physicians, age- and sex-adjusted average numbers of visits per person were computed using the direct standardization procedure (Ipsen & Feigel, 1970). This technique weights the rate of physician utilization by the proportion of a "standard population" in that age-sex group. The standard population used was the distribution of the population 21 and under in Suffolk County according to the 1970 Census. Table 4 shows the average annual number of visits for specific age groups and the age-sex adjusted number of claims and lists first primary care physician specialties and then specialists in order of decreasing frequency of use.

Pediatricians were the most common provider among children in the sample. In addition, clients who visited a pediatrician had the highest average number of visits among primary care physicians, 3.6 per year. Family practitioners and general practitioners also saw sizeable proportions of the sample, but had lower average numbers of visits with 2.9 and 2.0 visits per year respectively. Internists and osteopaths saw fewer clients; children seeing internists made an adjusted average of 2.38 visits per year while those seeing osteopaths made an average of 1.39 visits per year.

The most frequently used specialists were surgeons and ophthalmologists. These specialists had an adjusted average rate of a little more than one visit per year. Pediatric specialists (e.g., pediatric cardiologists, pediatric allergists) had the highest adjusted number of visits with 3.1 per year; internal medicine specialties with 2.6 visits per year and obstetrician-gynecologists with 2.2 visits per year were the next two highest groups. While these groups had a high adjusted average rate of visits per year, few individuals in the sample used these specialists suggesting that these rates may not be extremely stable. For example, 47 (only 1.8% of those visiting a physician) made visits to a pediatric specialist, 64 (2.4%) saw an internal medicine specialist, and 156 (5.9%) saw an obstetrician-gynecologist.

Table 4 can also be used to compare age- and sex-specific rates of utilization. Pediatricians were the most frequently used provider for children age 4 and under, and provided an average of 5.6 visits per year for boys age 4 and younger and 6.5 visits per year for girls 4 and younger. The number of children visiting pediatricians declined with age; fewer children 10-14 and a still smaller number of youth 15-21

visited pediatricians. Approximately 65% of the children seeing pediatricians were 9 or younger, while 12% were 15 or older. Older youth were more likely than young children to see general internists, family practtitioners, general practitioners, and osteopaths.

Among children 4 and under, internists provided the second highest average number of visits with 3.98 for males and 5.26 for females. Family practitioners followed with 3.41 visits per year for males and 3.08 visits per year for females. Boys 4 and under made an average 2.32 visits per year to general practitioners while girls 4 and under made an average 2.44 visits per year to GPs. Of all primary care physicians, osteopaths saw the fewest children age 4 and under, with males making 1.36 visits per year and females, 1.68 visits per year. Note that while pediatric specialists and internal medicine specialists had high rates of visits, only a small proportion of children saw those specialists.

Table 4 also shows that gynecologists saw a few young girls and boys in addition to teen-age females. This is an example of the hidden system of general care (McDermott, 1974; Aiken, 1979) where specialists are actually providing primary care. Our data do not allow us to examine the reasons for visits to office-based physicians, so we can not measure the extent of this hidden system of general care. The use of gynecologists by young children indicates that such a system exists.

Computing age-adjusted rates of visits controls for the effect of age on the number of physician visits, since younger children usually make more physician visits than older children. The age-adjusted figures show that children who visited pediatricians still had the highest annual rate of visits, while children seeing other generalists had lower rates. It is possible that children seeing general practitioners, for example,

made fewer visits to physicians overall, or made visits to other physician specialties as well. Table 5 shows the age and sex-adjusted total number of visits to all physicians for each physician specialty. While Table 4 counted the number of visits to pediatricians, Table 5 reports the number of visits per year to all office-based physicians for children who had seen a pediatrician.

Children seeing pediatricians had an adjusted rate of 4.65 visits to all physicians per year. This is the second lowest annual rate of visits to physicians; only those visiting osteopaths had a lower adjusted rate (4.12 visits per year). Among primary care providers, children visiting an internist had the highest adjusted rate, 10.46 visits per year.

Table 6 shows the total number of claims of all types made by children using various types of physicians. Among those visiting primary care providers, children seeing osteopaths had the lowest adjusted number of total claims, 10.10 claims per year. Individuals seeing pediatricians and general practitioners had the next lowest adjusted rate of claims, with 11.38 and 11.58 claims per year respectively. Overall, individuals seeing an internal medicine specialist had the highest adjusted rate of claims.

Thus, it appears that while children seeing pediatricians had more visits to that physician type they had fewer visits to all physicians and fewer claims of all kinds. Another way of expressing this is by looking at the proportion of physician visits which were to a specific provider type. Table 7 shows that for children visiting pediatricians, 79.2 percent of their claims for service were to pediatricians. This is the highest proportion among the primary care providers; for example,

among those visiting family practitioners, 60% of their visits were to family practitioners. Children visiting general practitioners received 56% of their care from GPs, children seeing osteopaths obtained 54.8% of their services from osteopaths, and children seeing internists had 53.3% of their visits with internists.

It is possible that children who used internists, osteopaths, and general practitioners were sicker and were, therefore, more likely to be referred to other physicians. If that is the case, we would expect that individuals using these types of physicians would have had a higher proportion of their claims to specialists of various kinds. Table 8 compares the proportion of visits to specialists by type of primary care provider visited. Children seeing pediatricians had the lowest adjusted proportion of visits to specialists, with 11.8% of their physician visits to specialists, while those seeing osteopaths and internists had the highest proportion of claims to specialists, 17.3% and 16.9%, respectively. While there is a 20% difference between pediatricians and other primary care physicians' proportion of visits to their own specialty, the range in proportion of visits to specialists is only about 5%; it does not appear that children using internists, osteopaths, and general practitioners were being referred to specialists at a higher rate than those using pediatricians. Instead, individuals seeing these primary care providers also saw other kinds of primary care providers.

Table 9 compares the proportion of claims to other primary care physicians by type of primary care physician most frequently seen. Children seeing either family practitioners, general practitioners, internists, or osteopaths had at least 25% of their physician visits with other types of primary care providers, while those visiting pediatricians

primarily had only 9% of their physician contacts with other kinds of primary care physicians. Thus, individuals using general practitioners, family practitioners, internists, and osteopaths had a lower proportion of visits to that kind of physician, not because they had a higher proportion of claims to specialists, but because they had a higher proportion of claims to other primary care physicians. This may indicate that pediatricians were more likely than other primary care physicians to maintain continuing care relationships with Medicaid children. Since older children were more likely to use general practitioners, internists, and osteopaths, either they were less likely to maintain continuing relationships with a single provider or were making a transition from pediatricians to other primary care physicians.

The effect of age on utilization of physician specialties

The age-specific utilization rates suggest differences in the use of office-based physicians by age. Older youth were more likely to seek care from a variety of primary care physicians and were also more likely to visit specialists than were younger children. While the previous section examined utilization of physician specialties controlling for age, this section examines whether age and sex have a significant impact on the utilization of office-based physician specialties.

An analysis of covariance compared the proportion of claims to each type of primary care provider and the proportion of claims to specialists by the age-sex categories used in the adjusted figures (see Table 10). The analysis controlled for the total number of claims per year, which was significant in all analyses. The number of claims per year had a slight negative correlation with the proportion of claims to

the specific provider type and a slight positive correlation with the proportion of claims to specialists suggesting that children with higher number of claims had a higher proportion of visits to other providers. With these data, it is impossible to know whether individuals were more likely to see different kinds of physicians because they had more claims or if these individuals had more claims to different kinds of physicians because of their medical needs.

Table 10 shows the main effects of analyses of covariance which were statistically significant. There is a significant variation in the proportion of claims to pediatricians by age-sex group. Overall, children who see office-based pediatricians make 81% of their visits to pediatricians. Young children make the highest proportion of their physician visits to pediatricians: males age 4 and under make 85% of their physician visits to pediatricians and females 4 and under make 90% of their physician visits to pediatricians. Older youth seeing pediatricians make a lower proportion of their visits to pediatricians; 73% of visits by males 15 and older and 66% of visits by females 15 and older who see pediatricians are to pediatricians. Table 10 also shows that youth age 10 and older who saw pediatricians had a higher proportion of claims to specialists than younger children.

No significant age-sex differences were observed in the proportion of claims to general practitioners, family practitioners, internists or osteopaths by individuals seeing that type of practitioner. There were differences, however, in the proportion of claims to specialists. In general, it appears that older children had a higher proportion of claims to specialists. This is especially apparent for females 15 and older, which may be accounted for by their use of gynecologists. Youth

15 and older who saw general practitioners had a higher proportion of claims to specialists than did younger children ($p<.001$). The same finding holds for youth seeing family practitioners ($p<.001$), and internists ($p=.015$). There were no significant differences in the proportion of claims to specialists for individuals seeing osteopaths.

Since the use of a gynecologist may explain the larger proportion of specialist claims for girls 15 and older, claims to gynecologists were excluded from the proportion of claims to specialists (see Table 11). Significant differences by age-sex groups were still observed for pediatricians, general practitioners, family practitioners and internists. Younger children still had the fewest claims to specialists. Individuals 15 and older, both male and female, and males 10-14 had the largest proportion of claims to specialists, with females 10-14 and males 5-9 following closely ($p<.001$). Among individuals seeing general practitioners, children 4 and under had the lowest proportion of claims to other specialists, with children 5-9 having the next lowest proportion of claims, and males 15 and older, females 15 and older, and males 10-14 had the highest proportion of claims to other specialists ($p=.002$). Among individuals seeing family practitioners, children 4 and under had the lowest proportion of claims to other specialists, while males 15 and older had the highest proportion of claims to other specialists; females 15 and older and males 10-14 followed closely ($p<.001$). There were no significant differences in the proportion of claims made by individuals seeing osteopaths, however, nor were their results significant when gynecologist claims were included in the analysis.

Individuals visiting general internists had a slightly different pattern of use. Females under 4 had the lowest proportion of visits

to other specialists, with males and females 5-9 had the next lowest proportion of claims to other specialists (p=.037).

Analysis of covraiance was also used to examine differences in proportion of claims to other primary care providers (see Table 12). Among children seeing pediatricians, youth 15 and older had the highest proportion of claims to other primary physicians ($p<.001$). The trend reversed for individuals seeing general practitioners and family practitioners: children under 4 had the highest proportion of claims to other primary care physicians, while individuals 15 and older had the lowest proportion of claims to other primary physicians ($p<.001$ for each). In addition, the overall mean proportion of visits to pediatricians was .08, while the mean proportion for general practitioners was .27 and family practitioners was .24, suggesting that children of all ages seeing pediatricians make more of their primary care visits to pediatricians while children seeing general practitioners and family practitioners have approximately one-quarter of their primary care visits to other primary care practitioners. Young children see pediatricians almost exclusively for their care and while older youth may still see a pediatrician on occasion, they appear to be making a transition to other primary care physicians, and making more visits to specialists. Young children who see non-pediatric primary care physicians are less likely to use them exclusively; and have a higher proportion of claims to other primary physicians, most notably pediatricians. Older youth who used non-pediatric primary physicians saw few primary physicians of other types, but saw a larger proportion of specialists.

In sum, age and sex did have a significant effect on physician use. Older youth were less likely to see pediatricians and more likely

to see specialists. Since the age-adjusted figures showed that after controlling for age, children who saw general practitioners, family practitioners, internists, and osteopaths had a higher proportion of visits to other generalists than did children seeing pediatricians, not all differences in the number of visits and type of physician were due to age.

Approximately 60% of Medicaid children in the sample saw office-based physicians during the three-year study period. Nearly one-fourth of the children saw a combination of primary care physicians and specialists. Pediatrics was the most frequently used physician specialty, particularly for younger children. Children who received any care from pediatricians obtained a high proportion of their care from pediatricians. Black children were more likely to see general practitioners and osteopaths, while white children were more likely to see family practitioners and internists.

Age had an important effect on the use of different physician specialties. Older children saw specialists more frequently than did younger children and had fewer visits to any single physician specialty. Thus, there was a wide range in the utilization of office-based physicians by a Medicaid population, with demographic factors such as age and race affecting the use of various physician specialties.

Use of Office-based Physicians

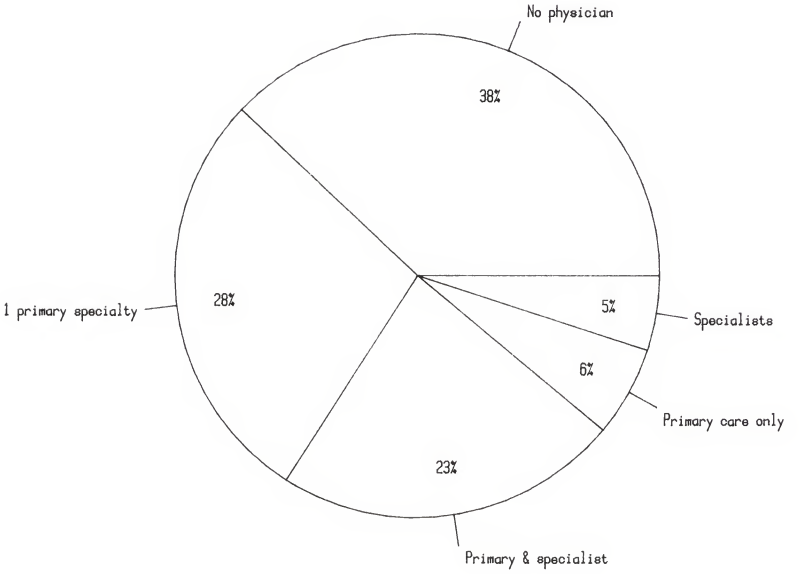


Table 1

Demographic Characteristics of Children
Visiting Office-Based Physicians

	Visiting Office-Based Physician	Not Use Office-Based Physician	Significance
Race			
Black	23.7%	24.1%	
Latino	12.6%	6.7%	$p<.001$
White	63.8%	69.2%	
Age			
0-4	23.3%	17.2%	
5-9	26.3%	19.7%	$p<.001$
10-14	24.2%	24.7%	
15-21	26.2%	38.4%	
Sex			
Male	49.1%	53.8%	$p=.003$
Female	50.9%	46.2%	
Insurance			
None	90.9%	87.0%	$p<.001$
Insurance	9.1%	13.0%	
Case Type			
Medicaid Only	14.2%	15.6%	
Public Assistance	85.8%	75.1%	$p<.001$
SSI	0.0	9.3%	

Table 2

Demographic Differences in the Use of Physician Specialties

Physician Specialty	Demographic (Group Over Represented)				
	Race	Age	Sex	Eligibility	Private Insurance
Pediatrician		9 and Under***			
Family Practitioner	White***	10 and Older**		Never Medicaid Only***	
General Practitioner	Latino*** Black	10 and Older***		Never Medicaid Only**	Never had Insurance**
General Internist	White***	15 and Older***			
Osteopath	Black***				
Surgeon	White***	10 and Older***			
Ophthalmologist	Latino*** White	5-14***			
Gynecologist		15 and Older***	Female**		
Otolaryngologist	White***	5-14***			
Neurologist		10 and Older**	Males*		
Dermatologist		10 and Older***			
Internal Medicine Specialist	White*	10 and Older**		Medicaid Only*	
Pediatric Specialties		4 and Under***	Males*		
Urologist			Males*		

*** $p<.001$
** $p<.01$
* $p<.05$

Table 3

Utilization of Physician Specialties

	No. of Patients	Percentage of Patients Seeing Physicians	No. of Visits per Patient per Year
Pediatrician, General	1,495	56.8	4.14
Family Practitioner	649	24.6	2.74
General Practitioner	563	21.4	1.99
Surgeon	334	12.7	1.29
Ophthalmologist	330	12.5	1.06
Internal Medicine, General	193	7.3	2.00
Gynecologist	156	5.9	2.29
Otolaryngologist	154	5.8	1.70
Neurologist	113	4.3	1.44
Osteopath	112	4.2	1.41
Dermatologist	111	4.2	1.77
Internal Medicine Specialist	64	2.4	2.42
Pediatric Specialist	47	1.8	4.22
Urologist	39	1.5	1.26

TABLE 4

Age and Sex Specific Annual Number of Visits to Each Physician Specialty

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
Pediatrician									
$\bar{X}$	5.64	6.49	3.51	3.78	2.62	3.00	1.88	2.31	3.59
N	233	247	250	229	173	176	83	98	1489
Family Practitioner									
$\bar{X}$	3.41	3.08	5.30	2.36	1.91	3.31	1.65	2.01	2.89
N	60	47	78	77	81	76	98	130	647
General Practitioner									
$\bar{X}$	2.32	2.44	2.74	1.68	1.32	2.07	1.61	2.08	2.03
N	35	47	74	53	79	74	99	99	560
Internist (General)									
$\bar{X}$	3.98	5.26	2.44	1.62	1.54	1.43	1.17	2.23	2.38
N	10	7	11	17	21	21	41	65	193
Osteopath									
$\bar{X}$	1.36	1.68	.89	2.08	1.67	.99	1.11	1.36	1.39
N	8	14	10	11	21	12	14	22	112
Surgeon									
$\bar{X}$	1.77	2.48	1.07	1.18	.98	1.07	1.15	1.19	1.33
N	35	27	33	26	48	36	62	65	332
Ophthalmologist									
$\bar{X}$	1.75	1.67	.98	.89	.75	1.08	1.15	1.15	1.15
N	11	14	59	52	44	58	34	56	328

TABLE 4--Continued

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
OB-GYN									
$\bar{X}$	2.12	3.70	4.36	4.11	0.00	.67	.54	2.22	2.23
N	33	6	3	4	0	3	3	104	156
Otolaryngologist									
$\bar{X}$	.94	1.17	1.79	1.52	1.18	1.36	2.56	3.44	1.74
N	16	4	34	28	19	26	12	14	153
Neurologist									
$\bar{X}$	1.61	1.02	1.10	2.36	1.30	1.99	1.13	1.48	1.51
N	9	4	19	9	18	11	21	22	113
Dermatologist									
$\bar{X}$	3.08	1.26	.90	1.25	2.37	1.73	2.08	1.70	1.77
N	6	5	14	11	15	15	19	26	111
Internist (Specialist)									
$\bar{X}$	5.11	2.94	1.16	2.90	1.49	3.58	2.03	2.22	2.62
N	2	3	6	7	11	12	8	15	64
Pediatric Specialties									
$\bar{X}$	1.77	6.88	1.00	.96	6.83	5.57	.33	1.71	3.08
N	15	6	8	6	7	3	1	1	47
Urologist									
$\bar{X}$	1.56	.50	1.01	.47	.90	1.16	1.03	2.90	1.30
N	4	1	5	4	12	2	5	6	39

TABLE 5

Annual Number of Claims to All Physicians by Physician Specialty Seen

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
Pediatrician									
$\bar{X}$	6.96	7.38	4.53	4.72	3.59	4.05	2.64	3.87	4.65
N	233	247	250	229	173	176	83	98	
Family Practitioner									
$\bar{X}$	6.57	6.51	8.15	4.24	4.19	5.54	3.28	4.78	5.41
N	60	47	78	77	81	76	98	130	
General Practitioner									
$\bar{X}$	5.58	6.02	8.47	3.81	2.82	5.88	2.84	4.28	4.98
N	35	47	74	53	79	74	99	99	
Internist									
$\bar{X}$	8.58	6.81	7.88	4.82	3.60	9.03	2.71	4.97	6.04
N	10	7	11	17	21	21	41	65	
Osteopath									
$\bar{X}$	10.53	4.91	2.66	4.04	3.47	1.93	2.96	3.28	4.12
N	8	14	10	11	21	12	14	22	
Surgeon									
$\bar{X}$	9.30	12.83	5.55	6.50	5.19	9.99	3.54	6.05	7.23
N	35	27	33	26	48	36	62	65	
Ophthalmologist									
$\bar{X}$	11.72	8.24	4.61	5.80	3.88	5.66	4.05	6.26	6.15
N	11	14	59	52	44	58	34	56	

TABLE 5--Continued

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
OB-GYN									
$\bar{X}$	9.29	5.81	90.60	13.83	0.00	7.00	1.74	5.14	18.05
N	33	6	3	4	0	3	3	104	
Otolaryngologist									
$\bar{X}$	9.42	11.36	6.94	5.71	4.19	11.68	6.49	9.39	8.02
N	16	4	34	28	19	26	12	14	
Neurologist									
$\bar{X}$	7.50	6.38	5.31	10.05	3.67	8.15	3.62	5.51	6.28
N	9	4	19	9	18	11	21	22	
Dermatologist									
$\bar{X}$	18.52	7.28	4.61	3.75	6.34	5.45	4.09	6.08	6.83
N	6	5	4	11	15	15	19	26	
Internist (Specialist)									
$\bar{X}$	13.87	12.34	8.09	15.28	12.39	10.04	4.24	7.45	10.46
N	2	3	6	7	11	12	8	15	
Pediatric Specialties									
$\bar{X}$	8.88	10.00	6.09	9.27	12.62	8.90	3.67	6.86	8.78
N	11	6	8	6	7	3	1	1	
Urologist									
$\bar{X}$	7.72	10.00	4.85	8.66	6.10	5.00	3.06	11.37	7.01
N	4	1	5	4	12	2	5	6	

TABLE 6

Total Number of Claims Per Year for Each Physician Specialty

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
Pediatrician									
$\bar{X}$	15.09	16.30	11.46	11.87	9.56	10.39	6.74	10.47	11.38
N	233	247	250	229	173	176	83	98	
Family Practitioner									
$\bar{X}$	14.31	14.27	18.39	10.22	8.76	11.94	8.58	12.56	12.39
N	60	47	78	77	81	76	98	130	
General Practitioner									
$\bar{X}$	13.64	13.58	17.24	9.13	6.96	12.86	7.44	11.53	11.55
N	35	47	74	53	79	74	99	99	
Internist (General)									
$\bar{X}$	16.64	19.08	16.04	14.25	9.10	21.94	7.42	15.35	14.91
N	10	7	11	17	21	21	41	65	
Osteopath									
$\bar{X}$	21.86	13.42	7.65	10.21	8.24	4.40	6.98	9.85	10.10
N	8	14	10	11	21	12	14	22	
Surgeon									
$\bar{X}$	18.62	30.50	12.48	17.08	12.43	20.56	9.19	15.59	16.74
N	35	27	33	26	48	36	62	65	
Ophthalmologist									
$\bar{X}$	34.61	23.32	13.97	13.34	11.76	13.65	11.20	17.30	16.89
N	11	14	59	52	44	58	34	56	

TABLE 6--Continued

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
OB-GYN									
$\bar{X}$	16.62	14.67	158.12	22.41	0.00	14.44	5.25	15.60	33.31
N	33	6	3	4	0	3	3	104	
Otolaryngologist									
$\bar{X}$	22.43	31.88	17.47	15.24	10.41	26.08	14.44	22.58	19.71
N	16	4	34	28	19	26	12	14	
Neurologist									
$\bar{X}$	23.79	20.17	12.84	22.79	9.59	15.04	8.87	14.66	15.82
N	9	4	19	9	18	11	21	22	
Dermatologist									
$\bar{X}$	34.31	15.26	12.56	11.93	21.85	13.89	11.19	16.44	16.97
N	6	5	14	11	15	15	19	26	
Internist (Specialist)									
$\bar{X}$	27.52	34.21	26.92	35.29	23.14	20.78	13.21	15.71	24.62
N	2	3	6	7	11	12	8	15	
Pediatric Specialties									
$\bar{X}$	16.86	22.71	18.17	20.18	23.87	15.27	5.67	12.00	16.93
N	15	6	8	6	7	3	1	1	
Urologist									
$\bar{X}$	13.22	23.00	15.62	16.65	15.76	6.17	6.71	18.89	14.43
N	4	1	5	4	12	2	5	6	

TABLE 7

Proportion of Claims to Specific Provider Types by Age and Sex

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
Pediatrician									
$\bar{X}$	.843	.891	.798	.829	.774	.800	.750	.660	.792
N	233	247	250	229	173	176	83	98	
General Practitioner									
$\bar{X}$	.503	.488	.625	.551	.630	.547	.693	.559	.560
N	35	47	74	53	79	74	99	99	
Family Practitioner									
$\bar{X}$	.607	.558	.591	.581	.590	.688	.610	.569	.600
N	60	47	78	77	81	76	98	130	
Internist									
$\bar{X}$	.403	.670	.548	.618	.491	.456	.553	.530	.533
N	10	7	11	17	21	21	41	65	
Osteopath									
$\bar{X}$	.378	.555	.505	.654	.598	.649	.522	.500	.548
N	8	14	10	11	21	12	14	22	

TABLE 8

Proportion of Physician Visits to Specialists for
Primary Care Physicians by Age and Sex

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
Pediatrician									
$\bar{X}$	.099	.044	.128	.104	.138	.129	.131	.160	.118
N	233	247	250	229	173	176	83	98	
General Practitioner									
$\bar{X}$	.058	.093	.092	.120	.134	.125	.154	.225	.125
N	35	47	74	53	79	74	99	99	
Family Practitioner									
$\bar{X}$	.083	.090	.125	.132	.163	.128	.201	.275	.150
N	60	47	78	77	81	76	98	130	
Internist									
$\bar{X}$	.201	.000	.089	.121	.224	.191	.260	.266	.169
N	10	7	11	17	21	21	41	65	
Osteopath									
$\bar{X}$	.370	.086	.100	.162	.103	.207	.179	.195	.173
N	8	14	10	11	21	12	14	22	

TABLE 9

Proportion of Claims to Other Primary Care Physicians

Physician Type	4 and Under		5-9		10-14		15-21		Age, Sex Adjusted
	Male	Female	Male	Female	Male	Female	Male	Female	
Pediatrician									
$\bar{X}$	.058	.065	.074	.067	.088	.071	.120	.180	.090
N	233	247	250	229	173	176	83	98	
Family Practitioner									
$\bar{X}$	.310	.352	.284	.286	.247	.185	.189	.156	.250
N	60	47	78	77	81	76	98	130	
General Practitioner									
$\bar{X}$	.439	.419	.283	.328	.236	.328	.153	.215	.297
N	35	47	74	53	79	74	99	99	
Internist									
$\bar{X}$	.396	.330	.363	.261	.285	.353	.187	.204	.297
N	10	7	11	17	21	21	41	65	
Osteopath									
$\bar{X}$	.252	.360	.394	.184	.299	.144	.298	.304	.279
N	8	14	10	11	21	12	14	22	

Table 10

Analysis of Covariance on Proportion of Visits to Primary Providers and Proportion to Specialist by Provider Specialty and Age-Sex Group

	Proportion to Primary Provider	Proportion of Visits to Specialists by Primary Care Provider		
	Pediatricians	Pediatricians	General Practitioners	Family Practitioners
Grand Mean	.81	.11	.14	.17
Deviations from Mean				
Male, 4 and Under	.04	-.02	-.09	-.10
Female, 4 and Under	.09	-.08	-.06	-.09
Male 5-9	-.01	.02	-.05	-.05
Female 5-9	.02	-.00	-.01	-.03
Male 10-14	-.05	.04	.01	.01
Female 10-14	-.02	.03	-.01	-.03
Male 15-21	-.08	.04	.03	.05
Female 15-21	-.15	.05	.08	.10
Significance				
Main Effect	$p<.001$	$p<.001$	$p<.001$	$p<.001$
N of Claims (Standardized)	$p<.001$	$p<.001$	$p<.001$	$p<.001$

Table 11

Analysis of Covariance on Proportion of Visits to Specialists Other than Gynecologists for Each Type of Primary Care by Age and Sex Adjusted for Number of Claims

	Pediatrician	General Practitioner	Family Practitioner	Internist
Grand Mean	.10	.12	.14	.19
Deviations from Mean				
Male, 4 and Under	-.03	-.09	-.09	-.02
Female, 4 and Under	-.07	-.06	-.10	-.21
Male, 5-9	.03	-.04	-.03	-.10
Female, 5-9	-.00	-.01	-.01	-.08
Male, 10-14	.04	.03	.03	.04
Female, 10-14	.03	-.00	-.01	-.02
Male, 15-21	.04	.04	.06	.08
Female, 15-21	.04	.03	.04	.01
Signifiance				
Main Effect	p .001	p .001	p .001	p .001
N of Claims (Standardized)	p .001	p .001	p .001	p .001

Table 12

Analysis of Covariance on Proportion of Visits to Other Primary Care Providers by Type of Provider Seen and Age-Sex Group, Adjusted for Number of Claims

	Pediatricians	General Practitioners	Family Practitioners
Grand Mean	.08	.27	.24
Deviation from Mean			
Male, 4 and Under	-.02	.14	.07
Female, 4 and Under	-.02	.12	.11
Male, 5-9	-.01	-.01	.04
Female, 5-9	-.01	.06	.05
Male, 10-14	.01	-.01	.02
Female, 10-14	-.01	.05	-.05
Male, 15-21	.04	-.10	-.04
Female, 15-21	.10	-.07	-.08
Significance			
Main Effect	$p<.001$	$p<.001$	$p<.001$
N of Claims (Standardized)	NS	$p<.001$	$p=.002$

Chapter Eight

Patterns of Care of the Medicaid Client

This chapter examines Medicaid-eligible children's longitudinal patterns of care-seeking behavior. The longitudnal study of client patterns of care-seeking behavior will provide a better understanding of the utilization of health resources than does the analysis of visit level data, since visit level analysis can misrepresent the actual utilization (Shepard and Neutra, 1977). It describes the prevalence of different patterns of care, examines demographic characteristics in relation to patterns of care and examines the impact of pattern of care on use and cost of their services.

Solon (1972, 1960) identified several dimensions of an individual's pattern of care. The first dimension is the central source of care, which is the focal medical source who provides referrals to other sources. The volume source is the medical provider seen most often. The volume source and the central source are generally the same (Solon, 1972) but data will not allow us to determine the central source since we have no information on referrals or whom the individual defines as his/her most important provider. We will determine the volume source of care, however. A third dimension to the pattern of care, compactness, refers to the number of sources from which an individual receives medical services. Cohesiveness is a judgment of whether an individual's pattern of care has a "coherence or unity about it," something which we can not address with our data base. Levy et al. (1979) expands Solon's work and defines a different measure of pattern of care, configuration of care, which classifies individuals by the site of care, or combination of sites, and whether the individual has used multiple providers within each category.

As we have noted before, a large portion of the sample did not visit any primary care source: 36% never visited a physician, emergency room, or clinic. This chapter will examine the utilization patterns of the remaining 64% who did see a primary care provider. We examined the combinations of primary care - office-based physicians, neighborhood health centers, or out-patient clinics - which these children received. This measure is not sensitive to the frequency of use, but describes the type of providers Medicaid-eligible children see. Table 1 indicates that of the 2,911 individuals who did receive primary care during the study period, 90.5% saw an office-based physician. Approximately 48% saw only office-based physicians, while a third saw office-based physicians in combination with emergency rooms (ERs). Other patterns were less common: 5% saw office-based physicians, ERs, and neighborhood health centers (NHCs), 4% saw office-based physicians and NHCs. Among the 9.5% not seeing an office-based physician, 3.5% used NHCs only and 3.2% used ERs exclusively.

Table 1 includes children with only one or two claims to primary sources which may inflate estimates of the use of a single source of care. When examining the combinations of care used by children making three or more visits to primary care sources during the study period (see Table 2), we find that 95.6% saw an office-based physician and that 4% did not see an office-based physician. The proportions of children seeing office-based physicians and another source of care increased: half the children have seen only office-based physicians, while another third visited office-based physicians and emergency rooms. Most importantly, we found that only 10 (.5%) of children making three or more visits to primary care sources used the emergency room as their sole source of care.

Table 2 also indicates that 43% of all children using ambulatory services and 52% of those with three or more claims visited an ER. The majority of individuals using the emergency room did so in combination with visits to an office-based physician: 810 (39.8%) used an ER and physician; 8% used an ER, physician and neighborhood health center; 1% used a physician, ER, and OPD; and .5% used an ER, physician, NHC and OPD. Chapter 6 discusses ER use in more detail.

Seventeen percent of children making three or more ambulatory claims visited an NHC. Most used the NHC in combination with an office-based physician: 106 (5.2%) used an NHC and physician, 159 (8%) used an NHC, physician and ER, 9 (.4%) used an NHC in combination with a physician, ER and OPD and 2 (.1%) used an NHC, physician and OPD.

Few children go to hospital out-patient departments, reflecting the scarcity of OPDs in Suffolk County: 1.9% of children making ambulatory visits have gone to an OPD, 2.4% of those with three or more ambulatory claims have gone to an OPD. Fewer use OPDs as their sole source of care. The OPD is generally used in combination with office-based physicians or Emergency Rooms. Thus, most individuals using ambulatory services have seen an office-based physician.

The prevalence of different patterns of care.

The volume source of care is that source (physician, ER or clinic) from whom an individual received most of his or her care. The volume source of care is an important factor in guiding an individual's health care, providing referrals to other sources of care and acting as the "manager"

of an individual's health care. For this analysis, the volume source of care is defined as the source with the greatest number of claims; OPDs and NHCs are combined into the category "clinic" since there are few claims to either source. If there is a tie between two sources, the more institutional and, by definition, inappropriate source is chosen. A tie between physician and ER is counted as ER, a tie between physician and clinic is counted as clinic, and a tie between clinic and ER is counted as ER. Office-based physicians are the most frequent volume source of care for children having three or more ambulatory care claims: 1,618 (79.4%) have a physician volume source of care, 229 (1.2%) have an ER as volume source of care, and 190 (9.3%) have a clinic as volume source of care.

Compactness of care describes whether a person's pattern of care has a unity or coherence about it (Solon, 1972). Compactness classifies patterns as either a single source (e.g., a specific physician, ER or clinic), a single type of care (e.g., only office-based physicians, but not the same physician), or multiple types of care (e.g. ER and physician). Among the 2,911 individuals making 3 or more ambulatory care claims, 1,164 (57.1%) used multiple types of care, 628 (30.8%) used a single type of care and 245 (12.0%) used a single source of care.

These results differ from Solon's research on a non-Medicaid population where a single source of care was the most common pattern, followed by multiple types of care. Medicaid children use multiple types of care most frequently, followed by using a single type of care; using a single source of care the least common pattern. It may be that the nature of the Medicaid

program, in combination with the incidence of childhood illnesses encourages the use of multiple types of care, while a paying population is able to use a single source of care.

A third measure of the pattern of care is the configuration of care. Levy et. al. (1979) described five different configurations of care:

1. No primary care -- emergency room only, OPD only, or ER and OPD
2. Primary care only -- physicial or neighborhood health center only
3. Comprehensive primary care only -- primary care with fewer visits to ER or OPD
4. Multiple primary care -- having more than one primary care program
5. Limited primary care -- primary care with ER used for serious problems

The fifth category, limited primary care, can not be used with our data set since we can not determine the seriousness of problems. In addition, category 5 should overlap with category 3. In order to establish an exhaustive set of categories, three additional configurations were examined:

6. Multiple comprehensive primary care -- primary care, with multiple sources, and fewer visits to the ER
7. More visits to the ER, OPD than to physician
8. More visits to ER, OPD than physician, with multiple sources

The configuration of care taps two dimensions of the child's pattern of care-seeking behavior: the combinations of services used and whether those services are from the same provider. Table 3 shows that multiple comprehensive care and multiple primary care were the most common sources of care for Medicaid children with three or more ambulatory care visits. This suggests that most Medicaid-eligible children receive care from an office-based

physician or neighborhood health center, but do not receive all from the same physician. The most common pattern is seeing more than one office-based physician or NHC and also using an ER, followed closely by visiting multiple physicians. The least common patterns involve extensive use of the emergency room: only 5% used ERs or OPDs only, and 6% made more ER visits than visits to office-based physicians.

Demographic differences in pattern of care.

This section describes demographic differences in patterns of care and reports Chi square probabilities for individuals with three or more claims to physicians, ERs or clinics. Three variables summarize data from the four reported eligibility periods: 1) insurance dichotomizes whether or not a child was covered by private insurance as well as Medicaid; 2) casetype divides the population into three eligibility categories - those who were eligible for MAO during all the eligibility periods, those who were eligible for MAO during at least one eligibility period, and those eligible for cash grants and medical assistance during their eligibility periods, 3) move dichotomizes whether the individual moved from one township to another during their eligibility. Moves within a township are not counted because it is assumed moves of such a short distance were unlikely to affect utilization. Table 4 summarizes significant demographic differences for each of the pattern of care measures by indicating which groups are over-represented. For example, older youth, age 10 - 21 ($p<.001$), males ($p=.002$), and Blacks ($p<.001$) are more likely to have an emergency room as their volume source of care. Whites and Latinos are more likely to have an office-based physician

as their volume source of care, while children under 4, youth 15 - 21, and Blacks are more likely to use a clinic as their volume source of care. The use of the ER by older children may reflect a trend for adolescent children to make fewer routine visits to health care providers and to have more accidents. Since only a small number of individuals have a clinic as their volume source of care and many clinics offer pediatric services, more younger children are probably seen in a clinic setting than are older children. There were no significant differences in the source of eligibility or whether an individual had private insurance. Individuals who moved from one township to another were more likely to have an emergency room or clinic volume source of care, ($p=.002$). This suggests that mobile individuals are either less likely to develop a continuing relationship with an office-based physician, or have had their care relationship disrupted.

In summary, males are more likely to use emergency room services, either in combination with a physician, or as a sole source of care. This may indicate that males are more likely to have accidents, or are less likely to visit a physician routinely. Older children are more likely to use primarily emergency room services or to use multiple types of care. White and Latino children are more likely to have a physician as a volume source of care, but are also more likely to see more than one physician.

While there are many demographic differences in pattern of care, Chi square analysis can not measure the predictive power of demographics. Discriminant analysis was used to predict pattern of care, with demographic and eligibility variables as predictors. The stepwise discriminant technique indicates the relative importance of each variable, and measures

how well the demographic and eligibility data predict or explain the pattern of care. The discriminant analysis indicate that the demographic and eligibility variables are not strong predictors of an individual pattern of care. Demographics and eligibility variables explaines 11.27% of the variance in the configuration measure, 6.5% of the variance on the compactness measure, and 5.5% of the variance in the volume source of care. The amount explained in the configuration of care indicates that the variables have some effect on pattern of care; number of months eligible was the most important variable, followed by whether the individual was Black, age, whether the individuald had private insurance, sex, and whether the individual was white.

Effects of the pattern of care on utilization.

What effect does a child's pattern of ambulatory care have on the use of secondary services such as labs, drugs, and hospitalization? Policy makers have assumed that one reason the use of office-based physicians is cost-effective is that the physician can better coordinate the use of other services and avoid unnecessary tests. We tested this hypothesis with the claims data.

Using claims data to define the pattern of care and also to relate that pattern to the utilization and cost of other services, such as drugs and lab work, creates a measurement problem when attempting to assess the impact of pattern of care on the utilization of other services. Both the independent variable, pattern of care, and dependent variable, such as drug or lab claims, are closely related to the total number of claims. It appears that, for whatever reason, the number of claims is related to the

the pattern of care, so that individuals with a higher number of claims fall into different categories than those with a lower number of claims. This it is difficult to separate the impact of number of claims from the impact of the pattern of care. Suppose we find that indeed there is a difference in the number of hospitalizations and that individuals with multiple comprehensive primary care have the highest number of hospitalizations. Is the number of hospitalizations higher because, as the literature might suggest, these individuals have more fragmented, or crisis-oriented care, or is it simply because people with a high number of claims are likely to fall into that particular pattern of care and if an individual is high on the total number of claims, he is likely to be high on the number of hospital claims, as well as any other kind of claim? The second argument arises from a probability concept that the more often a Medicaid patient makes visits to a provider, the lower the probability that the individual will see the same provider.

Analysis of covariance was therefore used to analyze the effect of patterns of care on the number and cost of other services. Since the distribution of number of claims per year is skewed, the data were transformed by taking the square root of the sum of the number of claims per year plus .5 (cf. Meyers, 1972: 77). Transforming the data in this manner increases the homogeneity of the variance, and improves the skewness and kurtosis. The analysis of covariance controlled for the number of claims per year and examined the effect of the pattern of care variables on the number of lab, drug, equipment claims, number of hospitalizations and total cost. The covariate, the standardized annual number of claims, was

significant at the .001 level, indicating that the total number of claims was highly related to the use of other care. Analysis of covariance provides two sets of means for each pattern of care. The first are unadjusted and reflect the absolute number of other claims individuals in a certain group made. The second set of means are adjusted for the annual number of claims.

The volume source of care has a significant effect on the number and cost of drug claims per year, the number and cost of lab claims per year, the number and cost of hospitalizations per year and the total cost of care per year. Analyses on the volume source of care illustrate the differences between the unadjusted means and the means which have been adjusted for the annual number of claims. Individuals whose volume source of care is an emergency room have the lowest number and cost of drug claims. However, individuals with an emergency room volume source of care have fewer total claims per year than individuals with other sources of care. Drug claims compose a slightly higher proportion of this group's total claims than they do for physician or clinic volume sources of care; individuals with an emergency room volume source of care become the middle group when adjusting for the total number of claims per year. Table 5 provides information on the unadjusted transformed number of drug claims, the adjusted number of drug claims, and the significance level of the covariate and the pattern. Individuals whose volume source of care is a physician have the highest number and cost of both drug and lab claims (See Table 6) per year ($p=.001$ for each). At the same time, individuals whose volume source of care is a physician have the lowest number and cost of hospitalizations per year (See table 7) and total cost per year ($p=.001$ for all) (See Table 8). Thus it appears that individuals who see a physician most often

have a higher number of services such as drugs and lab work, while having the lowest total cost per year. On the other hand, individuals with a clinic volume source of care have the lowest number and cost of lab and drug claims per year, while have the highest number and cost of hospitalizations per year as well as the highest total cost after adjusting for the total number of claims.

There are several possible explanations for this difference. First, it may be that Medicaid individuals who are hospitalized are followed up in a clinic. If that were the case, we would expect a difference in the number and cost of hospitalizations for neighborhood health centers and outpatient departments. An analysis of covariance compared children whose volume source of care was a hospital OPD and those whose volume source of care was a neighborhood health center suggesting that individuals with NHCs and OPDs as a volume source of care do not differ significantly in the number or cost of hospitalizations or the total cost of care. Since there is no significant difference between those using OPDs and those using NHCs, higher hospital and drug costs cannot be due to individuals being followed up in a hospital OPD. The second possibility is that NHCs are a more expensive source of care. The high number and cost of hospitalizations and high total cost may support such an argument. Finally, needs and health status may differ for these groups.

The compactness of care had fewer significant effects on the use of other health services (See Tables 9 -11). Individuals with a single source of care had the lowest absolute number of drug claims, but also had fewer total claims than the other groups. After adjusting for the total number of claims, individuals with a single source of care have the highest number of drug claims

(p=.028), the lowest number and cost of lab claims, (p=.002) and the lowest total cost of care (p=.021). Individuals using a single type (but multiple sources) of care have the highest number of lab claims. This may indicate a duplication of services when more than one provider is used or may result from sicker children who need more lab work using more than one provider. Individuals with multiple types of care have the highest total cost; this may suggest that the use of several types of care is not cost-effective, if we assume that there is no difference in health status of the children in these groups.

The configuration of care has an effect on the number and cost of drug and lab claims (See Tables 12-13). There was no significant difference in the number or cost of hospitalizations, number or cost of equipment, or total cost. Individuals with no primary care have the lowest absolute number and cost of both drug and lab claims as well as the lowest total cost. Since only 16 individuals fall into this pattern, reliable conclusions can not be drawn. Individuals with primary care only have the second highest number of drug claims (p=.013). Individuals with multiple comprehensive care have the highest absolute number and cost of drug claims per year, but after adjusting for the total number of claims, these groups have a medium value. Individuals with multiple primary care and multiple comprehensive care have the highest number and cost of lab claims per year (p=.001). Individuals with more visits to the emergency room than to a physician or multiple physicians have the lowest number and cost of both lab and drug claims. Individuals with more visits to the ER than to multiple physicians have the highest total cost while individuals with primary care only have the lowest total cost. In sum, individuals using several

sites, especially those who see several physicians, have a high number of lab claims while individuals who use more emergency room services than other types of care have lower number of claims for drugs and lab, but have a higher total cost.

Summary

This chapter began by asking if there were differences between people who use mainly the emergency room and those tho use mainly a physician or clinic, and whether people using the ER would have a higher number of claims for "supplementary" services such as lab work, drugs, equipment, and hospitalizations. Our analysis indicates two major findings. First, relatively few individuals use the emergency room as their sole source of care; most individuals using the ER also see physicians. Second, individuals with relationships with physicians, at least multiple physicians, have the higher number of lab and drug claims than do individuals using an ER. The data suggest that the key inappropriate or inefficient pattern to the use of multiple providers, possibly multiple physicians and ER use.

The use of multiple providers is more common than exclusive use of the emergency room and appears to be more expensive. Second, clinics as a volume source of care seem to produce high costs and a high number of hospitalizations. This raises the question as to whether clinics are an efficient provider of primary care services, but further research is needed to determine the effect of health status on the patterns of care and use of other services.

There are also demographic differences in utilization. In general, older youth, males, Blacks, individuals with no other insurance, and individuals who have moved from one township to another are more likely to have

a pattern of care involving emergency room use, or multiple providers. They may have fewer ties to physicians, or may need specialized care requiring the use of multiple sources of care.

Different patterns of care produce significant differences in the number and cost of other services. In general, individuals with a physician volume source of care or a single source of care have a high number and cost of drug and lab claims, but have lower total costs and lower number and costs of hospitalization. Individuals with a mixed pattern of care, that is, multiple types of care or multiple physicians have a higher number of hospitalizations and total costs. Although these differences support our original hypotheses, the explanatory power of the demographic and eligibility characteristics is greather than the explanatory power of the pattern of care. Further research using health interviews and claims data could further clarify the relationship between pattern of care and the use of other services.

Table 1

Combinations of Primary Care Sources

Used by Children Visiting Primary Care Providers

Types of Providers Seen	No.	%
Physician only	1,420	48.8
Physician and ER	889	30.5
Physician, ER, Neighborhood Health Centers (NHCs)	159	5.5
Physician and NHC	122	4.2
Physician, ER, out-patient department (OPD)	23	.8
Physician and OPD	10	.3
Physician, ER, NHC, OPD	9	.3
Physician, NHC, OPD	2	.1
NHC only	104	3.6
ER only	96	3.3
ER, NHC	64	2.2
OPD only	7	.2
ER, OPD	4	.1
NHC, OPD	1	.0
ER, NHC, OPD	1	.0
TOTAL	2,911	100%

Table 2

Combinations of Primary Care Sources Used By

Children Making Three or More Visits

To Primary Care Providers

Types of Provider Seen	No.	%
Physician only	831	40.8
Physician and ER	810	39.8
Physician, ER, and NHC	159	7.8
Physician, NHC	106	5.2
Physician, ER, OPD	23	1.1
Physician, ER, NHC, OPD	9	.4
Physician, OPD	8	.4
Physician, NHC, OPD	2	.1
NHC only	30	1.5
ER only	10	.5
ER, NHC	41	2.0
OPD only	2	.1
ER, OPD	4	.2
NHC, OPD	1	.0
ER, NHC, OPD	1	.0
TOTAL	2,037	99.9%*

*due to rounding error

TABLE 3

Configuration of Care for Medicaid-eligible
Children with Three or More Ambulatory Care Claims

Configuration	Number	Percent
No primary care	16	.5%
Primary care only	275	13.5%
Comprehensive primary	204	10.0%
Multiple primary care	692	34.0%
Multiple comprehensive care	721	35.4%
More ER visits than physicians	80	3.9%
More ER than multiple physicians	49	2.4%
Total	2037	100.0%

TABLE 4

Demographic Differences in Patterns of Care

	Volume Source of Care			Compactness of Care		
	ER	Physician	Clinic	Single Source	Single Type	Multiple Types
Age	*** 10-21	*** 5-14	*** Under 4 15-21	*** 4 and under	*** 10-14	15-21
Sex	** Males					
Race	*** Black	*** White Latino	*** Black	*** Black	*** White Latino	*** Black
Insurance				** have	** have	** No insurance
Type of Assistance				Always MAO Only***	Always - Some MAO***	Cash*** Grant
Mobility	Did move**		Did Move**			

*** $p < .001$

** $p < .01$

TABLE 4 - continued

Demographic Differences in Patters of Care

	Configuration of Care						
	No Primary	Primary Only	Comprehensive Primary	Multiple Primary	Multiple Comp Primary	More ER Than Physician	More ER Than Mult.Phys.
Age	15-21***	9 and under***	4 and under***	10-14***	15-21***	10-14***	10-21***
Sex	Males**		Males**			Males**	Males**
Race		Black***	Black***	White, Latino***		Black***	White***
Insurance		Has Insurance**		Has Insurance**	No Insurance**	No Insurance**	No Insurance**
Type of Assistance		Always MAO**		Always - Some MAO**	Cash Grant**		
Mobility					Did Move***	Did Move***	Did Move***

*** $p < .001$

** $p < .01$

TABLE 5

Transformed Number and Cost of Drug Claims
by Volume Source of Care

Volume Source of Care	N	Number of Drug Claims		Cost of Drug Claims	
		Unadjusted	Adjusted	Unadjusted	Adjusted
Physician	1618	1.98	1.93	4.48	4.36
Emergency Room	229	1.56	1.82	3.29	3.98
Clinic	190	1.63	1.72	3.54	3.79
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Volume Source of Care		$p < .001$		$p < .001$	

TABLE 6

Transformed Number and Cost of Lab Claims
by Volume Source of Care

Volume Source of Care	N	Number of Lab Claims		Cost of Lab Claims	
		Unadjusted	Adjusted	Unadjusted	Adjusted
Physician	1618	.91	.90	1.80	1.62
Emergency Room	229	.81	.86	1.32	1.54
Clinic	190	.79	.81	1.19	1.27
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Volume Source of Care		$p < .001$		$p < .001$	

TABLE 7

Transformed Number and Cost of Hospitalizations
of Volume Source of Care

Volume Source of Care	N	Number of Hospitalizations		Cost of Hospitalizations	
		Unadjusted	Adjusted	Unadjusted	Adjusted
Physician	1618	.83	.83	5.52	5.35
Emergency Room	229	.82	.85	6.17	7.10
Clinic	190	.91	.92	10.11	10.45
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Volume Source of Care		$p < .001$		$p < .001$	

TABLE 8

Transformed Total Cost of Care
by Volume Source of Care

Volume Source of Care	N	Total Cost	
		Unadjusted	Adjusted
Physician	1618	16.76	16.33
Emergency Room	229	17.10	15.03
Clinic	190	13.10	12.25
Significance			
Covariate, Annual Number of Claims		$p < .001$	
Volume Source of Care		$p < .001$	

TABLE 9

Transformed Number and Cost of Drug Claims
by Compactness of Care

Compactness	N	Number of Drug Claims		Cost of Drug Claims	
		Unadjusted	Adjusted	Unadjusted	Adjusted
Single Source	245	1.75	1.97	--	--
Single Type	628	1.93	1.91	--	--
Multiple Types	1164	1.91	1.88	--	--
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Compactness		$p = .028$		not significant	

TABLE 10

Transformed Number and Cost of Lab Claims
by Compactness of Care

Compactness	N	Number of Lab Claims		Cost of Lab Claims	
		Unadjusted	Adjusted	Unadjusted	Adjusted
Single Source	245	.81	.86	1.19	1.38
Single Type	628	.93	.93	1.84	1.82
Multiple Types	1164	.88	.88	1.71	1.68
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Compactness		$p = .002$		$p = .006$	

TABLE 11

Transformed Total Cost of Care
by Compactness

Compactness	N	Total Cost	
		Unadjusted	Adjusted
Single Source	245	13.66	15.57
Single Type	628	17.26	17.10
Multiple Types	1164	17.97	17.65
Significance			
Covariate, Annual Number of Claims		$p < .001$	
Compactness		$p = .02$	

TABLE 12

Transformed Number and Cost of Drug Claims
by Configuration of Care

Configuration	N	Number of Drug Claims		Cost of Drug Claims	
		Unadjusted	Adjusted	Unadjusted	Adjusted
No Primary Care	16	1.40	2.06	3.10	4.83
Primary Care Only	275	1.76	1.95	3.78	4.29
Comprehensive Primary Care	204	1.72	1.90	3.65	4.12
Multiple Primary Care	692	1.93	1.90	4.39	4.32
Multiple Comprehensive Primary Care	721	2.07	1.91	4.72	4.30
More ER, OPD than Physician	80	1.42	1.77	2.88	3.79
More ER, OPD than Multiple Physicians	49	1.52	1.62	3.53	3.77
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Configuration		$p < .001$		$p = .013$	

TABLE 13

Transformed Number and Cost of Lab Claims
by Configuration of Care

Configuration	N	Number of Lab Claims		Cost of Lab Claims	
		Unadjusted	Adjusted	Unadjusted	Adjusted
No Primary Care	16	.77	.89	1.22	1.77
Primary Care Only	275	.81	.85	1.19	1.35
Comprehensive Primary Care	204	.81	.84	1.26	1.41
Multiple Primary Care	692	.93	.85	1.54	1.82
Multiple Comprehensive Primary Care	721	.93	.88	1.42	1.83
More ER, OPD than Physician	80	.78	.84	1.12	1.40
More ER, OPD than Multiple Physicians	49	.80	.81	1.25	1.32
Significance					
Covariate, Annual Number of Claims		$p < .001$		$p < .001$	
Configuration		$p = .003$		$p < .001$	

Chapter Nine

Continuity of Care

One aspect of mainstream medical care in the United States is the proverbial doctor-patient relationship. When the doctor knows the patient well, it is argued, he is able to provide better care because he can detect patterns of illness and sometimes subtle changes in condition, which a physician seeing the patient for the first time would miss. Similarly, when the patient knows and is comfortable with his physician, he is less likely to delay seeking care beyond an appropriate time, thus avoiding unnecessary complications of minor illness, and he may be more likely to use the telephone to report symptoms and to seek advice instead of incurring the expense of an office visit.

While these benefits would be valuable for a Medicaid program that is unable to contain its expenditures, there has been relatively little evidence in the literature that demonstrate conclusively that they are present reliably (see Davidson and Perloff, 1981, for a summary of the literature). With the data available in the Suffolk County Claims files, we are able to make some progress in showing the extent to which continuity does in fact have those benefits for a population of Medicaid children.

A. The Operationalization of Continuity of Care

Ideal continuity of care is receiving all services from one provider who has access to an up-to-date medical record. The Suffolk County data includes information on the site of each visit, but it cannot be determined

in all cases if the treating physician were always the same or if a comprehensive record were available and used at each visit. For purposes of this study, it was assumed that the patient's record was available to the provider when the visit was at the same site, (e.g., neighborhood health center, office-based physician) and that the visit was usually with the same provider because 76 percent of all visits were made to office-based solo practitioners. Thus, this study explored continuity of care by site at least, and usually by medical record and provider as well.

Three measures of continuity were used in this study. Two measures, the Usual Provider Care (UPC) and Continuity of Care (COC), focus on the concentration of services among providers. The third, Sequential Nature of Continuity (SECON), focuses on the sequence of visits made to providers.

1. UPC

The determination of the UPC measure, developed by Breslau and Reeb (1975), is a straightforward two-step process which generates a continuous variable ranging from slightly greater than 0.0 to 1.0. The first step is to determine the modal provider in terms of number of visits to a specific provider included in the four provider groups: generalist physicians, specialist physicians, hospital emergency rooms (ERs), and hospital and neighborhood health clinics.[1] Generalist physicians included

[1]The latter two sources of care were combined because of the relatively small numbers of each and the absence of significant differences on measured attributes.

office-based general and family practitioners, general internists, pediatricians, and general osteopaths, a categorization used by Aiken et al. (1979). Specialists are all other office-based physicians.

The second step is to divide the number of visits made to the modal provider by the total number of visits made to all providers included in the four provider categories. The algebraic formula for this estimator is:

$$UPC = \frac{n_m}{n_t}$$

Where: n_m = number of visits made to the modal provider

n_t = number of visits made to all providers

When this formula was introduced in the literature, only primary care physicians were included as providers. Visits to clinics, emergency rooms, and specialists were omitted from the computation. However, Breslau and Reeb were analyzing a situation in which the patients being studied were already connected with a group of pediatricians as their regular providers. The present analysis was different since patients were included, not because of the principal source of their care, but because of the source of payment for care. All Medicaid-eligible children were included. Many of these children had no usual source of care or used a clinic, emergency room, or specialist as their principal provider. Further, since the use of specialists as sources of continuous care has been recently documented in the literature (Starfield, 1979; Aiken, et al., 1979; Shortell, 1975; Thacker, et al., 1979), it is appropriate to include them, as well, as potential usual providers in calculating the UPC.

2. COC

The Continuity of Care (COC) measure developed by Bice and Boxerman (1977) is another summary measure of concentration which yields a continuous variable ranging from 0.0 to 1.0. Unlike the UPC, it is not a score which simply compares visits to the primary care source with all other visits. Rather, it includes consideration of the dispersion of visits to all sources of care.

For example, consider two cases with a total of ten visits each to all health care sources, six visits of which were to a single provider. In one instance, the remaining four visits were to four different providers, and in the other, to only a single provider. Both would result in identical UPC scores of .60. Using the COC calculation, however, the utilization patterns for the patient with four sources would show less continuity than that with only one additional provider. The scores would be .47 and .33, respectively.

The algebraic formula for this estimator is:

$$COC = \frac{\sum_{i=1}^{s} n_i^2 - n}{n(n-1)}$$

Where: n = total number of visits to all providers

n_i = number of visits to provider i

s = total number of providers

The original formulation of the COC measure was designed to include referral data which, however, is unavailable from the present data base. Bice and Boxerman developed the measure with the intent that referrals by one provider to another physician or clinic would be included in the

total continuity score for the referring source. Thus, assuming that each visit is unreferred increases the number of source(s) and decreases the concentration (or total number of visits for providers making referrals (n_i), a squared term). For those cases that have been referred, this procedure will understate the estimate of continuity.

Even though all providers were considered to be unreferred sources of care, this research may not have understated continuity as much as one might initially have suspected, however. First, as previously cited, specialists are a common source of continuing care (Aiken et al., 1979). Second, some patients seek out specialists for nonprimary care, i.e., for the physician's specialty, without referral from another physician. Miller (1973) reported that one-third of the patients in his sample sought care in a cancer treatment and research center as self-referrals. Third, the vast majority of patients are not referred to other physicians. Three studies (Brock, 1977; Holmes, et al., 1978; Thacker, et al., 1979) showed overall rates of referrals of only 4 percent to 6 percent for all patients.

This study included a total of 22,993 patient visits of office-based physicians, clinics, and ERs, of which 3,611 (15.7%) were to specialists. In light of the previously cited findings, the number of visits that were true referrals in which the primary physician stayed in close contact with both his/her patient and the specialist may be relatively small.

3. SECON

The third measure, SECON, developed by Steinwachs (1979), determines the fraction of sequential visit pairs in which the patient saw the same

provider. The value of SECON is that it captures more of the process of utilization over time than summary percentages of either visits to the modal provider (UPC) or concentration among all providers (COC). Similar to the UPC and COC, SECON generates a continuous variable ranging from 0.0 to 1.0. The algebraic formula for this estimator is:

$$SECON = \frac{\sum_{i=1}^{n-1} S_i}{n-1}$$

Where: n = total number of visits to all providers

$n - 1$ = total number of possible sequential visit pairs

S_i = 1, if same provider is seen at sequential visits and 0 otherwise

To illustrate the differences among the three measures, consider the following example: if a patient saw each of two providers twice but saw provider A twice in a row and provider B twice in a row, the score of .50 for UPC and .33 for COC would be generated. The SECON score for this sequence would be .67.

However, if the visits were not in this AABB pattern but were in an alternating pattern, ABAB, even though the same UPC and COC scores would result, the SECON score would reflect this fragmented pattern and yield a score of 0.0. Table 1 illustrates the sensitivity of the UPC, COC, and SECON measures to changes in utilization patterns.

B. "Regular Users" of Medicaid

Of the 4,525 cases in the five-percent random sample, 815 cases (18%) were eligible during the entire 36-month period under study. The mean

number of months of eligibility for the entire sample was 17.3 or just short of one-half the entire period. However, 687 cases (15%) were eligible for only three months or less. If a child were eligible for so few months in a three year period and used correspondingly few services, it would have been difficult to extrapolate a utilization pattern with nay certainty, so these cases were excluded from the analysis.

A second restriction, which overlapped to a considerable extent with the prior one, eliminated those cases with two or fewer visits to a provider. Continuity as operationalized in this chapter, required at least two visits to compute, and 2,085 cases (46%) had fewer than two visits.

Further, Thomas Bice, the co-developer of the COC measure, contended that this measure should be used with patients who have a least four visits (reported in Roos, et al., 1980) in order to avoid biasing the results. When the analysis used the COC measure, therefore, the sample included only those children eligible for four months or more with at least four visits to a provider; 1,716 children or 38 percent of the original sample met these criteria.

For the rest of the analysis, the 2,003 children (44.3 percent of the original sample) with three visits or more who were eligible for at least four months comprised the sample. These "regular users" of Medicaid provided the pool of recipients for the study.

C. The Extent of Continuity in the Sample

Table 2 provides a summary of the continuity scores on the three measures. Viewing continuity from the perspective of the proportion of

visits made to the regular source of care (i.e., UPC), the average child saw his modal provider roughly three visits out of five. This result is comparable to other reports which have used this measure.

Breslau and Reeb (1975) developed the UPC to track the change in continuity of care that children in a pediatric group received before and after the practice moved from a suburban location to an inner city hospital. Their study showed UPC scores of .84 and .68 before and after the move. Those scores are higher than the Suffolk County UPC score, but Breslau and Reeb did not include visits to specialists, ERs, or clinics. Thus, for many cases their study excluded visits which would have been included in the denominator in the calculation if all sources of care had been considered, and their UPC scores would have been reduced.

Patten and Friberg (1980) used UPC to measure the extent of continuity that patients received from a model office in a family practice residency program. They tracked continuity of physician within the clinic and reported a UPC of .46 for all patients. They also reported a UPC of .63 for a subgroup of hypertensive patients.

Both of these studies used samples of less than 100 and only the Breslau and Reeb study was limited to children, so the comparisons have obvious limitations.

The overall COC score for regular users was .41. This was lower than the UPC score (.61) as expected since this index reflects the number of providers seen as well as the number of visits made to different providers. In the Patten and Friberg study, the COC was .205 for the entire group and .43 for the hypertensive patients. This compares to UPC scores of .46 and .63, respectively. Thus, the lower COC

score for the Suffolk County children shows roughly the same relationship to UPC as the Patten and Friberg study.

The mean score of .454 on the SECON index, indicates that nearly half of the visit pairs made by children were to the same provider. However, there was more variance in this measure than the UPC or COC. The standard deviation was higher, and the number of children with no continuity (13.8%) was much higher than either UPC or COC.

D. Perfect Continuity

Of the 2,003 regular users, 238 (11.9%) saw only one provider during their entire time on Medicaid. This compares favorably with a study of 242 poor newborns in New York City in 1967 reported by Mindlin and Densen (1969). With a less restrictive definition, they found 9 percent of their sample had perfect continuity. They had data on referrals; and if the child's referral to a specialist was followed-up by the referring physician, the specialist visit was treated as a visit to the regular source of care. Having no referral data on the Suffolk County children, we were not able to duplicate their methods.

Mindlin and Densen also reported variation by race, with black and Hispanic children having a much smaller proportion of children with perfect continuity than whites. This was not the case in Suffolk County. There, blacks had a higher proportion of perfect continuity than either whites or Hispanics. The numbers were not large in the earlier study, and neither were the proportional differences found in Suffolk County, so the findings on this point should be treated with caution (See Table 3).

Mindlin and Densen (1969) also found that perfect continuity was

associated with source of care. They hypothesized that receiving care from a clinic, which as in this study was considered a single source of care regardless of the physician seen, led to more fragmented care. The fact that blacks and Hispanics were more likely to use clinics as their regular source of care instead of office-based physicians was thought to lead to less continuity.

In this study, the data showed that blacks do use clinics significantly more than whites. On the other hand, although the numbers were small, clinic users had a greater proportion of cases with perfect continuity than the users of any of the other three types of care (See Table 4). Thus, the link between clinic use and less than perfect continuity of care was not supported by this data.

E. Variations in Continuity Across Programatic and Demographic Groups

1. Description of the Variables Studied

(a) Medically Indigent Status

To determine if there was an association between continuity of care and medically needy status, the cases were divided into three groups:

(1) Medical Assistance Only (MAO) throughout all periods of eligibility;

(2) MAO during some of the time the child was eligible;

(3) Never eligible for MAO during any period of eligibility, i.e., always a recipient of a cash payment in addition to Medicaid.

This breakdown resulted in reasonably large samples for cases with three or more visits. One hundred forty-four cases (7.2%) were always MAO, 182 (9.1%) were MAO some of the time,

and 1,677 (83.7%) were never MAO. For cases with at least four visits, the samples were 120 (7.0%), 156 (9.1%), and 1,440 (83.9%) for the three categories, respectively.

(b) Coverage by Private Insurance

Initially it was intended to break down coverage by private insurance into "Always, Sometimes, Never" division in the same way that medically indigent status was disaggregated. However, since only 15 cases (less than 1%) were covered by private insurance for their entire eligibility period, the cases were divided into two categories: private insurance coverage during at least part of the study period ("Ever"), and no private coverage ("Never"). Of those cases with three or more visits, 275 cases (13.7%) were in the Ever group with the remaining 1,728 cases (86.3%) in the Never group. For cases with four or more visits, 222 cases (12.9%) were in the Ever group and 1,493 cases (87.1%) were in the Never group.

(c) CHAP

Among the regular users with three or more provider visits only 347 cases (17.3%) had any CHAP (EPSDT) visits recorded, and of those with four or more provider visits, 324 cases (18.9%) had any such visits. Rather than developing a complicated grouping of cases with varying degrees of compliance with the periodicity schedule, the Ever-Never dichotomy was used for this variable as well.

(d) Immunization Record

For immunization history, the same Ever-Never dichotomy for regular users was used. In addition, only those children

who were seven years old or younger in 1979 were included, under the assumption that most older children would not need immunizations during the study period.

Results were sample sizes of 846 cases with three or more provider visits and 745 cases with four or more provider visits. Of the group with three or more visits 559 cases (66.1%) had immunizations, and 523 cases (70.2%) of the group with four or more visits had immunizations at least once (i.e., "Ever").

(e) Modal Provider Type

The determination of a child's regular source of care was made by counting each ambulatory visit to any provider (i.e., office-based generalist or specialist, hospital emergency room, hospital out-patient clinic or neighborhood health clinic).

The "modal provider type" was the source of care from which the child had the largest number of claims. If a child saw one particular generalist three times and had two visits each to two different hospital emergency rooms, he was classified as having a generalist as a modal provider.

In almost 10% of cases there were ties between two or more sources of care. When the tie was between providers of the same type, then that type was designated as the modal type. However, when the tie was between types (e.g., three visits to a particular generalist and three visits to a particular neighborhood health center), then the child had no modal provider and was omitted from the analysis when provider type was included (See Table 5).

(f) Age

In order to avoid children with "negative" ages, all children were assigned their age in 1979. In some of the analyses, age was used as a continuous variable, but for the analysis of variance section, the following quartiles were used: 0-4, 5-8, 9-12, and 13-21. The mean age for the group with three or more visits was 9.4 years. For the group with four or more visits, it was 9.2 years.

(g) Race/Ethnicity

Three racial/ethnic categories were used: Black, Hispanic, and White. The group with three or more visits included 488 (24.7%) Black children, 263 (13.3%) Hispanics, and 1,221 (61.9%) Whites. For the group with four or more visits, there were 421 (24.9%) Blacks, 230 (13.6%) Hispanics, and 1,037 (61.4%) Whites.

(h) Sex

There were 1,007 (50.5%) females and 988 (49.5%) males in the group with three or more visits. In the group with four or more visits where were 868 (50.8%) females and 840 (49.2%) males.

(i) Family Composition

Family composition was defined as the number of parents and children at home during the period of eligibility. Data on family composition was obtained for a subsample of 729 randomly selected cases. Of that group, 346 were eligible for four months or more and had at least three visits; 300 had at least four visits.

For the group with three or more visits, 119 cases (34.4%) had two parents at home; 212 (61.3%) were single-parent families; and 15 cases (4.3%) had no legal parent at home. The mean number of children per family for this group was 3.27.

For the group with four or more visits, 105 cases (35%) had two parents at home; 182 cases (60.7%) were single-parent families; and 13 cases (4.3%) had no legal parent at home. The mean number of children per family for this group was 3.31.

2. Bivariate Relationships -- Analysis of Variance and Sheffé Multiple Contrast Test

On the following page, Table 6 illustrates the results of an Analysis of Variance (ANOVA) performed on the ten variables.

Column 1 lists the variable with the categories or values used to create categories for each variable. Columns 2, 3, and 4 list the probability that chance caused the differences in means occurring for the scores on UPC, COC, and SECON for each category. When a variable was shown to be significant at the .05 level, the F ratio was reported to indicate the strength of the relationship.

Medically indigent status was not significant on any measure and there was no consistent pattern across the measures.

Having private insurance coverage in addition to Medicaid during some or all of the eligibility period was not significant on any measure, but the "Ever" group did have slightly higher means for all three measures.

Children who had contact with the CHAP program showed higher means on all three measures, but only on SECON was the difference between groups statistically significant, .4974 versus .4444.

Although children aged 7 or younger who had a least one immunization scored higher on all three continuity measures than children with no immunization, this, too, was significant only on the SECON measure. The two scores were .5330 versus .4608.

Modal provider type was significant on all three measures. Clinic users ranked highest, and patients of generalist physicians were second highest on all three measures. Children who used an ER or a specialist were either third or fourth depending upon the measure. Table 7 shows these results in detail.

Provider type was examined further, and the strictest a posteriori contrast test, the Scheffe test, was applied to the data. The significance level chosen was .01. The results of this test were two subsets of two means each of which could not be distinguished from each other, but were different from the other two means. The breakdown on all three measures showed both clinic and generalist users significantly higher on mean continuity than either ER or specialist users.

It is interesting to note that the division of groups on all three measures was not between office-based care, on the one hand, and institutionally-based care, on the other. Rather, users of clinics and generalist physicians continually scored higher on continuity measures than other patients. Two questions suggest themselves: first, why should clinics and generalists be grouped together; and secondly, why should clinics score higher than office-based primary care physicians? The answer to the first question is easier than the second. Neighborhood health centers and generalist physicians provide primary care, one element of which is continuity. While observers of the medical care scene have noted "a hidden system of general care" provided by specialists (McDermott, 1974;

Aiken et al., 1979), it is not unreasonable to expect that most of the care provided by specialists is specialty care. Moreover, to the extent that patients are referred for care, it by definition lowers their continuity scores. Emergency departments are not equipped to provide continuous care; they respond to episodes of illness or injury, and one visit is rarely connected to a previous one.

The answer to the second question is more difficult, and we can only offer some speculation. It is possible that the continuity scores for patients using clinics are higher than for those using primary care physicians because the office-based primary care physicians are appropriately managing their patients' care and referring them to specialists as needed. To the degree that occurred, the continuity scores would be lower for the office-based physicians. The clinics, on the other hand, may treat more conditions entirely with their own staff, which may include specialists. Given the nature of the data, a more definitive answer will need to wait for another study.

Age of the child in 1979 was shown as significant on the ANOVA analysis and with the Scheffe test as well. Table 8 shows that on all three measures continuity generally decreases as age increases, although the differences for the middle two age groups are small in each case.

Racial differences were found to be significant at the .05 level for the UPC and SECON. The COC measure showed a probability of less than .07. The racial rank order was consistent on all three measures with Blacks having highest continuity, followed by Hispanics, followed by Whites (see Table 9).

Sex differences were significant at the .05 level only on the SECON

measure, but girls scored higher than boys on all three measures. This finding may reflect the fact that boys are more likely to use services for accidents and injuries than girls and may not have the option of using their regular provider in those instances.

Family composition was shown to have so significant relationship to continuity. Number of siblings showed no consistency on any of the measures. Number of parents did yield the same rank order on all three measures, with two-parent families first, single-parent families second, and homes with no legal parents third.

3. Zero Order Correlations

Zero order correlations were run on all ten variables with each of the three continuity measures. Table 10 shows scores for any correlations significant at .05 or less. Probability levels for those correlations which were significant at .01 or less are indicated in parentheses below the correlation.

These results are consistent with the ANOVA analysis for most of the variables. Immunizations are shown to be significantly correlated with continuity on all the measures, but the correlations, from .09 to .17, are weak. Provider type shows the expected directions, but the clinic correlations are much weaker than the correlations with generalists even though clinic users have the highest means on all three measures. Racial correlations are weak. Being female is positively correlated on the UPC, yet it was significant for the SECON measure in the ANOVA analysis. Medically indigent eligibility status, the existence of private insurance coverage, and the family composition variables were not significantly correlated with any measure of continuity.

4. Crosstab Analysis of Race, Age, and Modal Provider Type

Because age, race, and provider type were significant on both ANOVA and correlations, crosstabs were examined pairing each of these variables with the other two.

No significant differences were observed on age by race. Mean age from Black, Hispanic, and White children were 9.1 years, 9.4 years, and 9.5 years, respectively. However, age by modal provider type was found to be significant (Chi Square = 64.2). While only 27 percent of children were in the 0-to-4 years age-group, they represented 39.1 percent of the clinic users. And, while the 13-to-21 years age-group consisted of 31.1 percent of the sample, they represented 52.9 percent of the specialist users.

Race by modal provider type was significant with a chi square of 74.6. Blacks, who were 24.7 percent of the sample, represented 43.4 percent of the clinic users. Whites, who were 61.7 percent of the sample, represented 79.7 percent of the specialist users.

Generalists were used by children of different ages and races very nearly in proportion to their numbers. Thus, a disproportionately large number of Blacks and young children went to clinics, and these three groups ranked highest on continuity. Similarly, a disproportionately large number of Whites and older children went to specialists, and these three groups ranked lowest on continuity.

5. Regression Analysis

Regressions were run using all ten demographic and programmatic variables and interaction terms with each of the three continuity

measures. After step-by-step elimination of the insignificant variables, including the interaction terms, only race, age, and provider type remained significant. Being Hispanic was not significant in any of the three regressions. Clinic use was found to be not significant for the COC and UPC regressions, but remained significant at the .05 level for the SECON regression.

Consistent with the previously reported findings, continuity was found to decrease with age on all three measures. Black children and generalist users had positive beta coefficients, and White children and users of specialists and ERs had negative beta coefficients.

All three regressions had significant overall F statistics, but the R^2 was low on all three (see Table 11). Thus, although these variables do make a difference, their overall explanatory power is rather weak.

The low R^2 in the regression indicates that some major determinants of continuity of care are not in this model. Shortell (1975) reported mode of payment and health status as the two most significant predictors of continuity. Patten and Friberg (1980) also reported presence of a chronic illness (i.e., health status) as a significant variable. In the present study, patient's health status was not available in this data base, and Medicaid was the mode of payment for all children.

Thus, age, race, and usual source of care are predictors of the degree of continuity that Medicaid-eligible children received in Suffolk County between 1977 and 1979, but they are not very strong predictors.

F. Continuity of Care and CHAP Participation

The EPSDT (CHAP) statutes do not explicitly state that a purpose of the program is to link children to a regular source of care, but suggested implementation policies for states stress the program's potential for this purpose (Children's Defense Fund, 1977: 189). The need for this linkage is quite clear. In four EPSDT Research and Demonstration Projects, between 68.2 percent and 86.5 percent of diagnosed problems were chronic conditions which needed care for an extended period of time (Children's Defense Fund, 1977: 185).

Organizational features of the program have ingibited needed linkages to primary care sources. In 1975 over half of all screenings nationally were done by state health departments, most of which do not provide comprehensive, continuous care. Few patients were given adequate information regarding appropriate sources of continuing care and diagnosed conditions remained untreated. Nationally in 1976, 1.1 million conditions were referred for follow-up, but one-half million conditions remained untreated. This performance has been attributed in part to poor information and referral processes, and to the link with EPSDT eligibility (Children's Defense Fund, 1977: 30). Since approximately one-third of children nationally will not remain eligible for Medicaid throughout a given year, eligibility for EPSDT services, too, is fragmented; and the opportunity for follow-up is limited.

Support services to enable patients to receive needed care have also been criticized as inadequate. Transportation, in particular, has been found to be substantially less than called for by the EPSDT statutes (Children's Defense Fund, 1977: 30).

Finally, low provider compensation has contributed to inadequate physician participation in the program. The national average fee for an EPSDT assessment to a provider was $21.00. The states of Florida and Oklahoma paid $6.50 and $9.00, respectively, for this service. Suffolk County paid $21.20, but health care services generally cost more than the national average in the Northeast. Thus, Suffolk County reimbursement is similar to many other areas regarding this problem.

Of the entire sample of 4,525 children, 394 (8.7%) had a CHAP screening during the three year study period. Among the 2,003 regular users, 347 children (17.3%) had screenings. Only 70 children (1.5%) in the entire sample had more than one screening. Thus, there was not widespread use of CHAP during this period.

Crosstabs were run with age, race, and modal provider type. Racial variations were not significant at the .01 level on the chi-square test, but age and provider type did show significant variations.

Screenings were performed on 50.4 percent of children seven years old or younger, who represented only 42.2 percent of the regular users. Generalists performed 90.9 percent of all screenings, but they were the modal provider for 76.6 percent of the children. Clinics were the modal provider for 9.3 percent of the regular users, but were responsible for only 1.9 percent of the CHAP assessment.

G. Continuity of Care and Utilization Patterns

1. Hospitalization

Alpert et al. (1976) reported significantly fewer hospitalizations and surgeries, and shorter length of stay for children receiving comprehensive, continuous care versus two control groups which did not

receive it. Gordis (1973) reported similar findings, and the Suffolk County data points in the same direction.

On all three measures, children who were not admitted to a hospital had higher scores on the continuity measures than children that had one or more admissions. The differences were significant at the .05 level on the UPC and COC measures, but they were not significant on SECON (see Table 12).

For those children with a hospital admission, slightly more than one-fourth of all children, significant differences on the mean length of stay on all three measures were observed. The relationship, however, was not linear. Children with an average length of stay of two days or less scored lowest on all three measures. Children with mean lengths of stay of more than two days to four days had the highest continuity ratings, followed by children with stays of four to seven days, and children with a mean of more than seven days.

This consistent pattern could indicate two findings. First, short-term admissions may be preventable when care is more continuous; and second, length of stay is lower when care is more continuous.

These conclusions should be treated with some caution, however, since data on diagnosis, reason for visit, and individual provider are not available.

2. Surgical Procedures

Children with lower continuity scores were much more likely to have surgery performed than children with more continuity (see Table 13). Seen as a categorical variable, ANOVA test shows F ratios of 35 to 48. Viewing surgery as a continuous variable, zero order correlations show

an inverse relationship between number of surgeries and continuity (see Table 14).

Given the limits of the data, it is not possible to interpret these findings. It may be that the lower continuity scores are an artifact of the measures, because referral data is not available. A child could be referred to a surgeon, and then get a second opinion, all under the coordination of a primary care physician. This would be continuous care, but it would result in a reduced score on all three continuity measures.

3. Overall Utilization of Services

Alpert et al. (1976) reported on the number of physician visits for an experimental group of children receiving continuous care and two control groups. Their findings showed that "illness" visits declined but "wellness" visits increased, and the total number of visits was the same for all three groups.

The Suffolk County data did not include information on the reason for visits, so this hypothesis could not be tested. However, it did show no relationship between continuity and either number of ambulatory visits or total number of all services (i.e., physician visits, ER visits, prescriptions, X-rays, etc.).

Table 15 shows the correlations between continuity and mean number of visits per year and mean number of services per year. All correlations were very weak, and only the UPC correlations were significant.

Continuity does not appear to influence overall utilization when measured by number of services, and it should be noted that the measures themselves are not influenced by the number of services used. Thus,

these measures are appropriate for samples where there is a large variation in services utilized per case.

H. Continuity and Overall Cost of Care

If no relationship exists between total number of services and continuity, but continuity reduces expensive hospitalizations and surgery, then children in continuous care relationships are substituting less expensive treatments for hospital and surgical care. This should result in reduced overall cost of care. The Suffolk County data supports this hypothesis.

Table 16 shows the mean cost per year for children in the highest, middle, and lowest third on each of the continuity measures. The UPC and COC differences are significant at .01 level, but the SECON differences were not statistically significant.

Table 17 reports on the zero-order correlations between annual total cost and the three continuity measures. All correlations are negative, as expected, and significant. However, they are also less than .10 indicating something less than dramatic savings associated with continuity.

The analysis may have shown more extensive savings if there had been a way to control for health status, but his was not possible. If, however, poorer health leads to higher continuity of care as well as greater need for care, then total costs would have shown an even greater reduction as a result of increased continuity. Thus, these results probably demonstrate the minimum savings for this population due to continuity of care.

TABLE 1

Sensitivity Analysis*

	Measures		
	UPC	COC	SECON
Distribution of Visits by Provider and Number of Different Providers Seen Remains Constant			
A. Number of visits increases	NC[1]	increases	increases
B. Sequence of visits changes from same provider at consecutive visits to visits alternating between providers	NC	NC	decreases
Number of Visits and Number of Different Providers Seen Remains Constant			
A. Distribution of visits shifts from a concentration on one provider to a more even distribution across providers	decreases	decreases	NC
B Sequence of visits changes from same provider at consecutive visits to visits alternating between providers	NC	NC	decreases
Number of Visits Remains Constant			
A. Number of different providers seen increases	Variable[2]	Variable[2]	decreases[3]

[1]NC = No change.
[2]Direction of change depends on distribution of visits among providers.
[3]Sequencing of visits assumed to be similar.

*This table has been adapted from a similar table presented by Donald M. Steinwachs (1979: 557).

TABLE 2

Continuity Statistics By Measure

STATISTIC	UPC	COC	SECON
MEAN	.608	.410	.454
MEDIAN	.600	.333	.429
STANDARD DEVIATION	.223	.269	.305
MINIMUM No. of Cases	0.111 (1)	0.000 (38)	0.000 (276)
MAXIMUM No. of Cases	1.000 (238)	1.000 (160)	1.000 (238)
TOTAL No. of Cases	2,003	1,716	2,003

TABLE 3

Children With Perfect Continuity
By Race

Race	Suffolk County (1977-1979) Percent of Total (Number of Cases)	New York City (1967) Percent of Total (Number of Cases)
Black	14% (69)	12% (8)
White	11% (135)	27% (3)
Hispanic	11% (29)	6% (10)
Other/Missing Race	16% (5)	-- --
ALL RACES	12% (238)	9% (21)

TABLE 4

Children With Perfect Continuity
By Modal Provider Type

Modal Provider Type	Percent of Children With Perfect Continuity (Number of Cases)
Generalist	14.0% (195)
Specialist	3.6% (5)
Emergency Room	6.9% (7)
Clinic	18.3% (31)
All Providers	11.9% (238)

TABLE 5

Modal Provider Type

Modal Provider Type	Cases with Three or More Visits	Cases with Four or More Visits
Generalist	1,389 (69.3%)	1,242 (72.3%)
Specialist	138 (6.9%)	120 (7.0%)
Emergency Room	116 (5.8%)	87 (5.1%)
Clinic	169 (8.4%)	139 (8.1%)
Tie (No Modal Provider)	121 (9.5%)	128 (7.5%)

TABLE 6

Analysis of Variance for Demographic and Programmatic Variables

Variable	UPC		COC		SECON	
	Mean	Significance	Mean	Significance	Mean	Significance
Medical Indigent Status						
Always Medically Indigent	--	NS	--	NS	--	NS
Sometimes Medically Indigent	--		--		--	
Never Medically Indigent	--		--		--	
Private Insurance Coverage						
Ever	--	NS	--	NS	--	NS
Never	--		--		--	
CHAP Contact Recorded						
Ever	--	NS	--	NS	.497	F= 8.68
Never	--		--		.444	df=3
						p < .01
Immunization (age 7 or younger)						
Ever	--	NS	--	NS	.533	F=10.766
Never	--		--		.461	df=3
						p < .01
Provider Type						
Generalist	.648	F=16.455	.449	F=21.997	.504	F=25.746
Specialist	.554	df=3	.305	df=3	.338	df=3
ER	.561	p < .001	.280	p < .001	.356	p < .001
Clinic	.684		.470		.565	
Age						
0-4	.659	F=19.593	--	NS	.539	F=25.752
5-8	.615	df=3	--		.448	df=3
9-12	.612	p <.001	--		.450	p < .001
13-21	.561		--		.385	

TABLE 6 - Continued

Variable	UPC		COC		SECON	
	Mean	Significance	Mean	Significance	Mean	Significance
Race						
Black	.629	F= 3.02	--	NS	.478	F= 3.906
Hispanic	.602	df=2	--		.475	df=2
White	.601	p<.05	--		.438	p<.05
Sex						
Male	--	NS	--	NS	.438	F= 4.832
Female	--		--		.469	df=2
						p<.05
Number of Parents at Home						
0	--	NS	--	NS	--	NS
1	--		--		--	
2	--		--		--	
Number of Children at Home						
1-8	--	NS	--	NS	--	NS

TABLE 7

Mean Scores on Continuity Measures

By Modal Provider Type

Modal Provider Type	Continuity Measures		
	UPC	COC	SECON
Clinic	.6840	.4699	.5647
Generalist	.6476	.4494	.5037
Emergency Room	.5607	.2799	.3564
Specialist	.5540	.3055	.3376

TABLE 8

Mean Scores on Continuity Measures

By Age Categories

Age	Continuity Measures		
	UPC	COC	SECON
0-4 Years	.6590	.4791	.5394
5-8 Years	.6146	.4134	.4585
9-12 Years	.6125	.4190	.4497
13-21 Years	.5608	.3451	.3850

TABLE 9

Mean Scores on Continuity Measures

By Race

Race	Continuity Measures		
	UPC*	COC**	SECON*
Black	.6294	.4345	.4784
Hispanic	.6016	.4093	.4755
White	.6007	.3984	.4380

* UPC and SECON results were statistically significant at the .05 level.

** COC differences were significant at the .07 level.

TABLE 10

Significant Zero-Order Correlations

For Programmatic and Demographic Variables*

Programmatic and Demographic Variables	Continuity Measures		
	UPC	COC	SECON
CHAP Contact	--	--	.0657
Immunization (1 or more)	.0924	.1345	.1405
Model Provider Type:			
Generalist	.2668	.2390	.2471
Specialist	-.0659	-.1061	-.1033
Emergency Room	-.0526	-.1115	-.0790
Clinic	.1035	.0664	.1105
Race:			
Black	.0544	.0525 (Prob.=.015)	.0461 (Prob.=.020)
Hispanic	--	--	--
White	-.0407 (Prob.=.034)	-.0519 (Prob.=.016)	-.0639
Female	.0492 (Prob.=.014)	--	--

* Significant at .01 except where indicated.

TABLE 11

Regression Models for

UPC, COC and SECON

Variables	UPC B	COC B	SECON B
Age	- .004	- .007	- .006
Hispanic	- .019	- .009	.010
Black	.028	.036	.034
Clinic	.028	.007	.051
ER	- .087	- .159	- .144
Specialist	- .076	- .115	- .138
Constant	.680	.500	.550
F	13.73	17.62	18.71
R^2	.044	.064	.059

TABLE 12

Analysis of Variance for Inpatient

Admissions and Mean Length of Stay

	UPC		COC		SECON	
	Mean	Significance	Mean	Significance	Mean	Significance
Inpatient Admissions per 100 children per year of eligibility						
0	.621	F= 7.559	--	NS	--	NS
1-50	.549	df=3	--		--	
51-100	.574	$p < .001$	--		--	
101-600	.588		--		--	
Mean Length of Stay per admission						
under 2 days	.522	F= 6.409	.315	F= 6.289	.354	F= 7.520
2-4 days	.619	df=3	.434	df=3	.487	df=3
4-7 days	.574	$p < .001$	.389	$p < .001$	.458	$p < .001$
more than 7 days	.541		.349		.389	

TABLE 13

Analysis of Variance for Surgical Procedures

	UPC		COC		SECON	
	Mean	Significance	Mean	Significance	Mean	Significance
Surgical Procedures per 100 children per year						
0	.633	F=48.89	.440	F=37.46	.483	F=35.469
1-50	.488	df=3	.277	df=3	.313	df=3
50-100	.459	$p < .001$	.245	$p < .001$	.281	$p < .001$
100-900	.467		.262		.284	

TABLE 14

Zero-Order Correlations

for Surgical Procedures

	UPC	COC	SECON
Correlation	-.2172	-.1947	-.1783
Significance Level	.001	.001	.001
N =	2003	2003	2003

TABLE 15

Zero-Order Correlations
For Visits Per Year and
Number of Services Per Year

	UPC	COC	SECON
Visits per Year	-.0561*	.0006	.0274
Total Number of Services per Year	-.0694*	-.0199	.0034
N =	2003	2003	2003

*Significant at the .001 level.

TABLE 16

Mean Cost of All Care Per Year
for Children Grouped by
Degree of Continuity

	UPC	COC	SECON
Highest third	323.08	333.68	378.47
Medium	404.35	463.12	433.49
Lowest third	634.81	638.23	532.68
F	8.34	5.912	2.023
df	2	2	2
probability	$p < .001$	$p < .01$	NS

TABLE 17

Zero-Order Correlations

for Annual Total Cost

	UPC	COC	SECON
Annual Total Cost	-.0963	-.0795	-.0528
Significance	$p < .001$	$p < .001$	$p < .01$
N =	2003	2003	2003

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APPENDIX I

Variables in the Data Base and Types of Claims Recording Them

APPENDIX 1

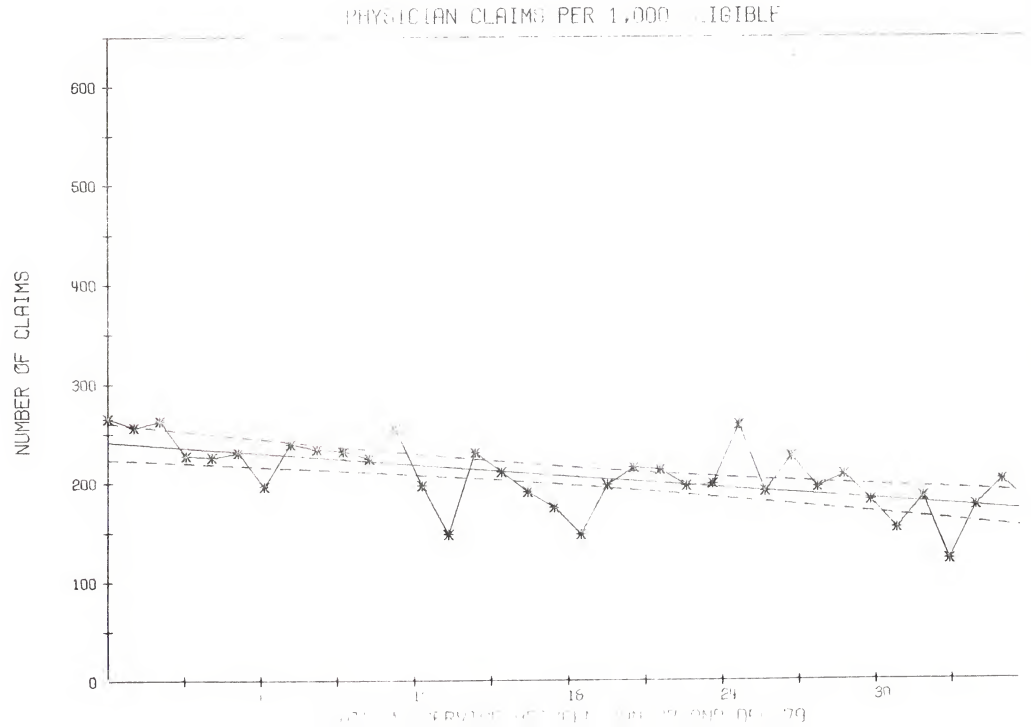
Variables in the Data Base and Types of Claims Recording Them

Variables from the eligibility file	Type of Claim
Race	All
Sex	"
Birthdate	"
Village	"
Zip Code	"
Eligibility category (4 occurrences)	"
Eligibility case type (4 occurrences)	"
Private insurance (4 occurrences)	"
Federal participation in charges (4 occurrences)	"

Variables from the claims file	
Provider ID number	All
Claim identifier	"
Client ID	"
Date of Service (from)	"
Date of Service (to)	Hospital
Amount paid	All
Date paid	"
Date of Admission	"
Date of Discharge	"
Number of days	"
Discharged to	"
Admitted from	"
# Refills	Drug
Therapeutic class	"
National drug code	"
Quantity	"
Clinic type	Clinic
Reason for visit	Clinic, emergency room
Type of carrier	Transportation
Type of trip	Transportation
Codes for specific services	Dental, eye, drug, physician, equipment clinic, emergency room

APPENDIX 2

Utilization of Services by Battered Children During the Three-Year Study Period


PHYSICIAN CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
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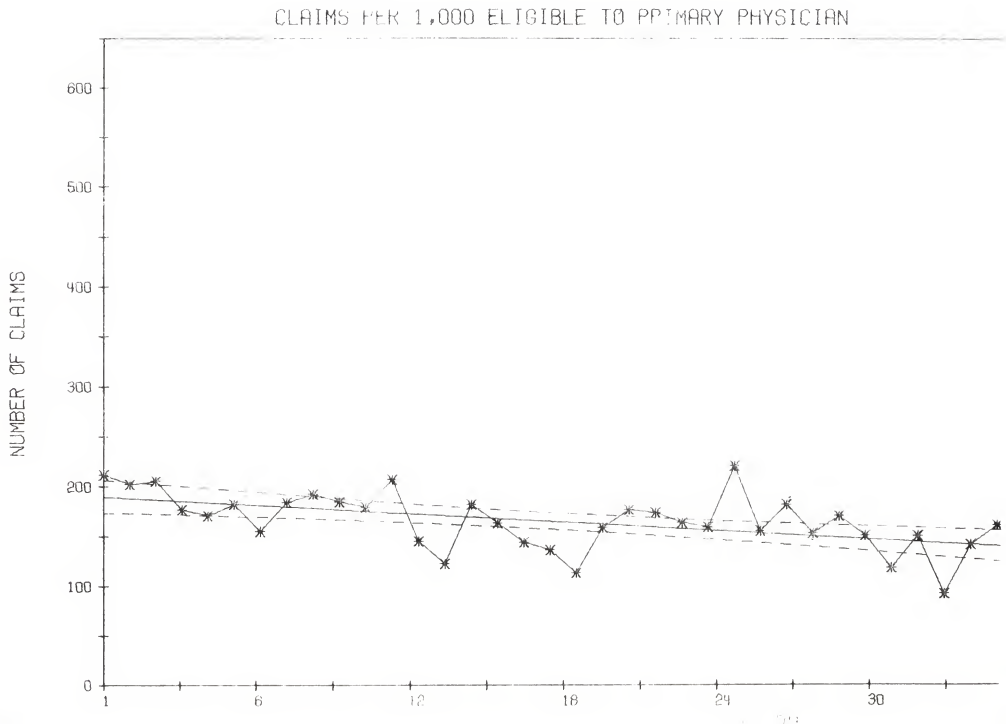
500
400
300
200
100
0
1
16
24
30


CLAIMS PER 1,000 ELIGIBLE TO PRIMARY PHYSICIAN
NUMBER OF CLAIMS
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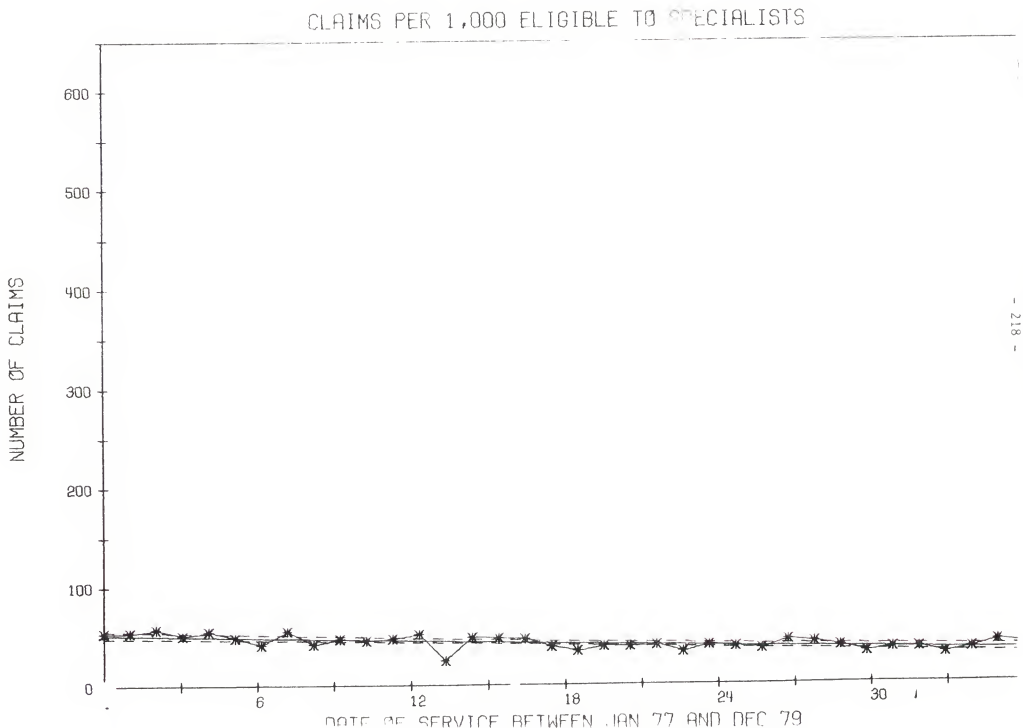
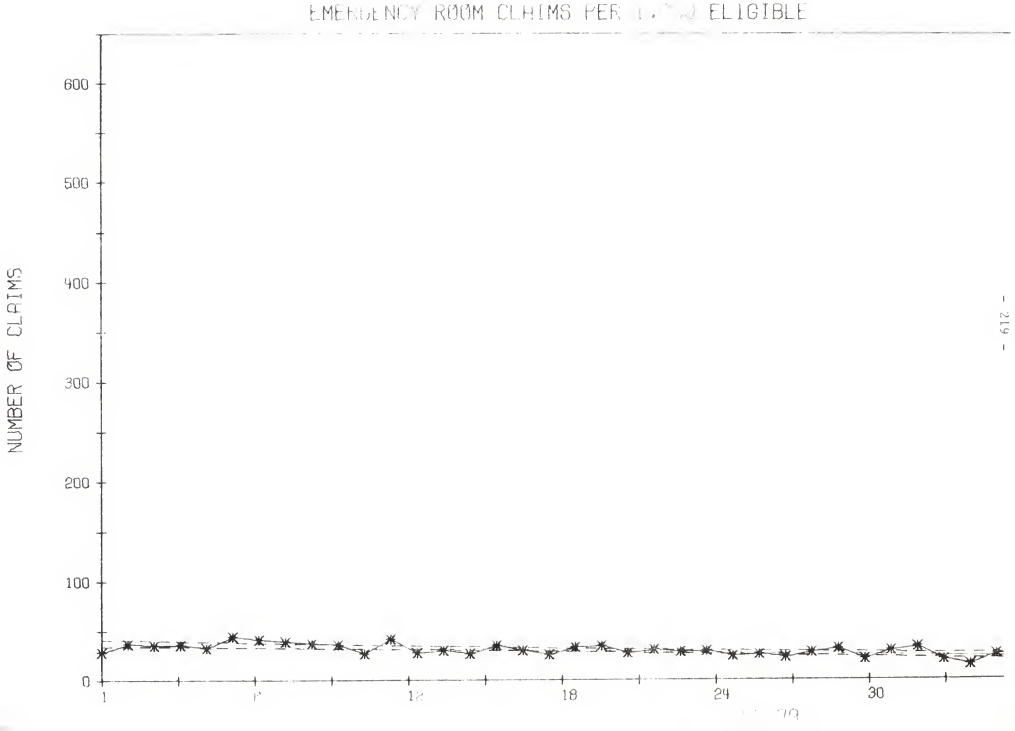
500
400
300
200
100
0
1
6
12
18
24
30


CLAIMS PER 1,000 ELIGIBLE TO SPECIALISTS
NUMBER OF CLAIMS
600
500
400
300
200
100
0
6
12
18
24
30
DATE OF SERVICE BETWEEN JAN 77 AND DEC 79


EMERGENCY ROOM CLAIMS PER
ELIGIBLE
NUMBER OF CLAIMS
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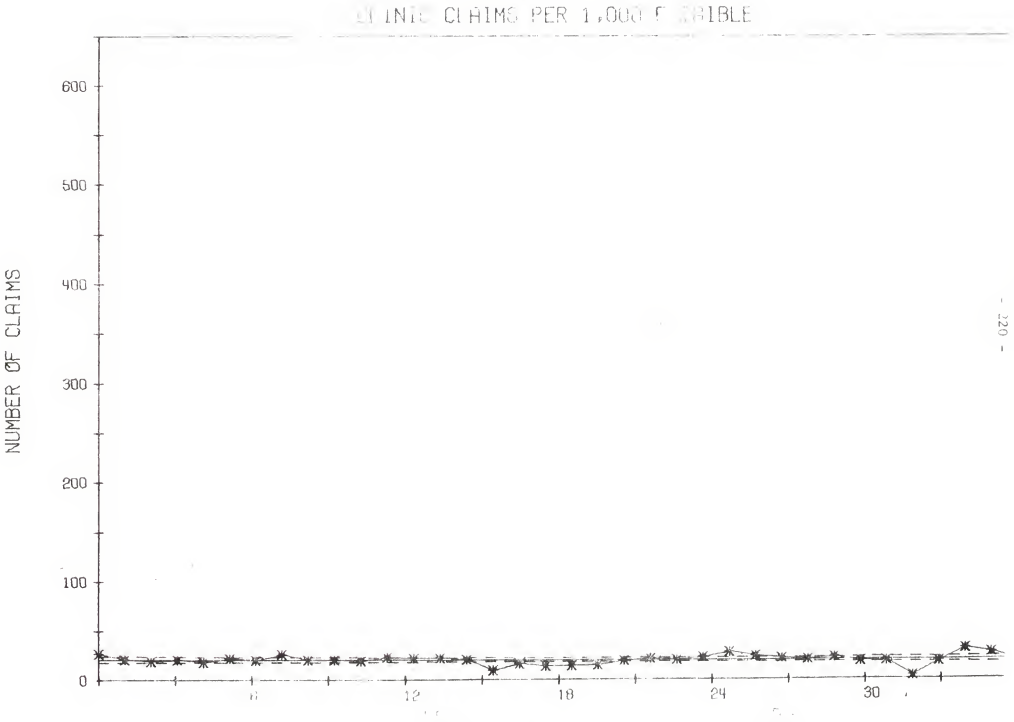
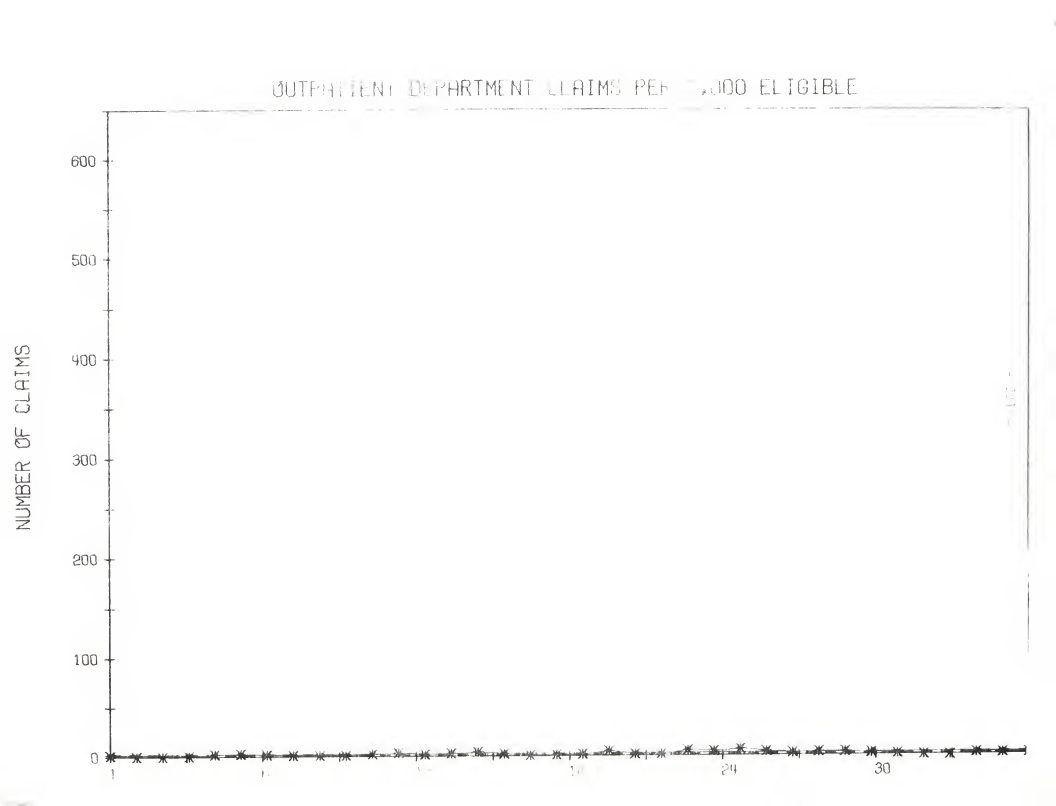
500
400
300
200
100
0
1
12
18
24
30


CLINIC CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
600
500
400
300
200
100
0
6
12
18
24
30


OUTPATIENT DEPARTMENT CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
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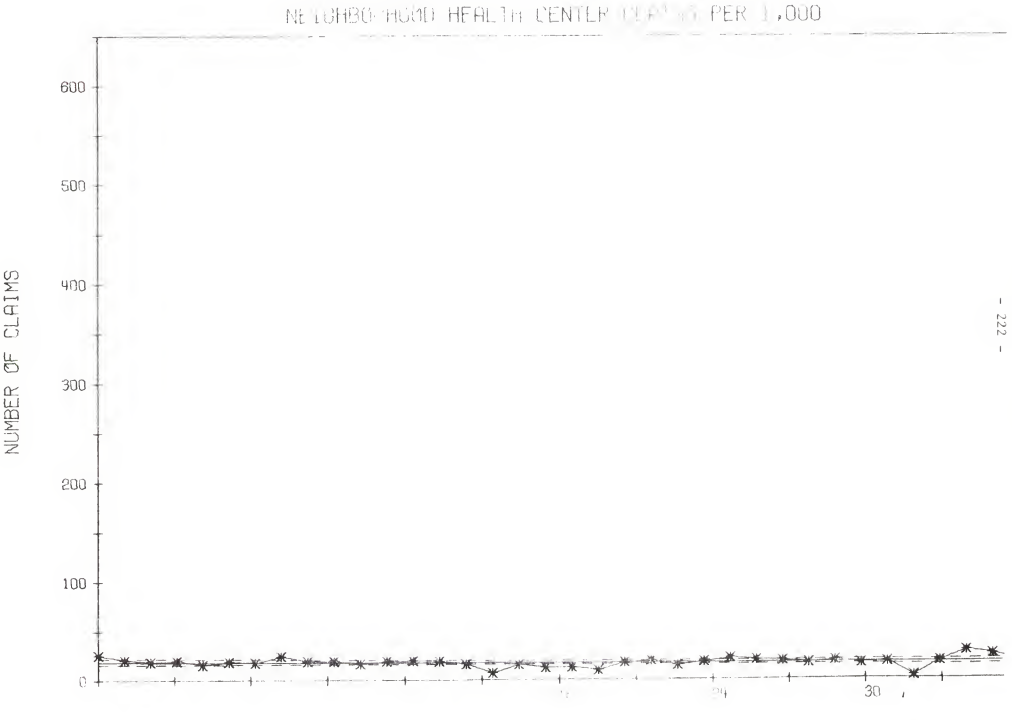
500
400
300
200
100
0
1
24
30


NEIGHBORHOOD HEALTH CENTER
PER 1,000
NUMBER OF CLAIMS
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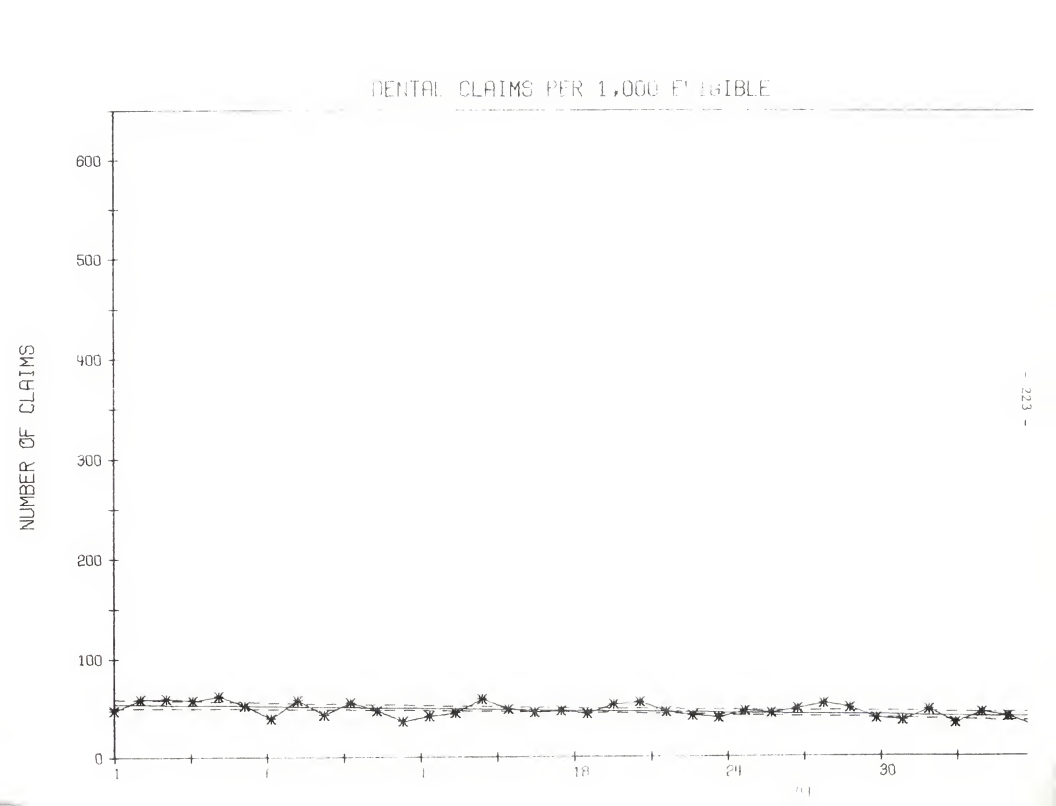
500
400
300
200
100
0
24
30


DENTAL CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
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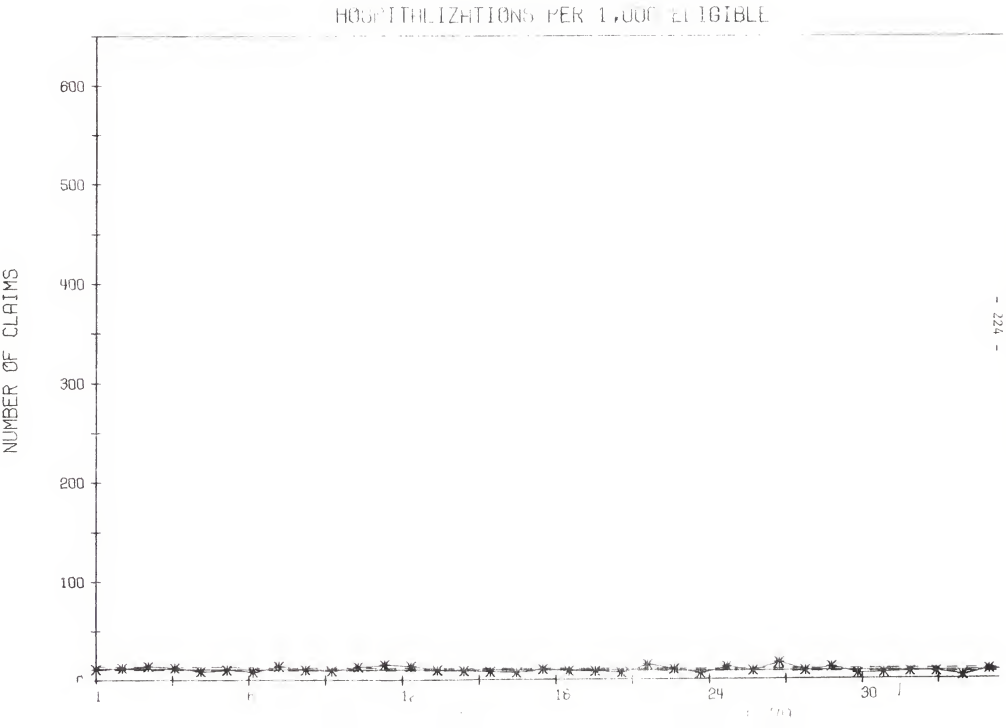
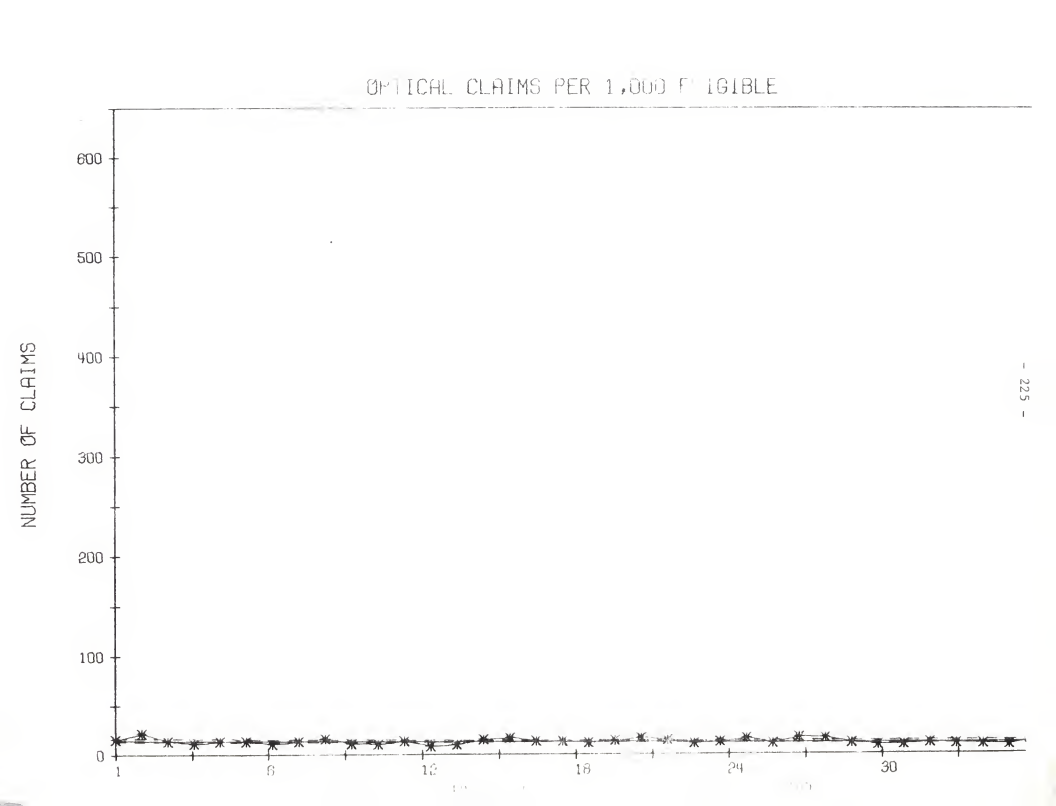
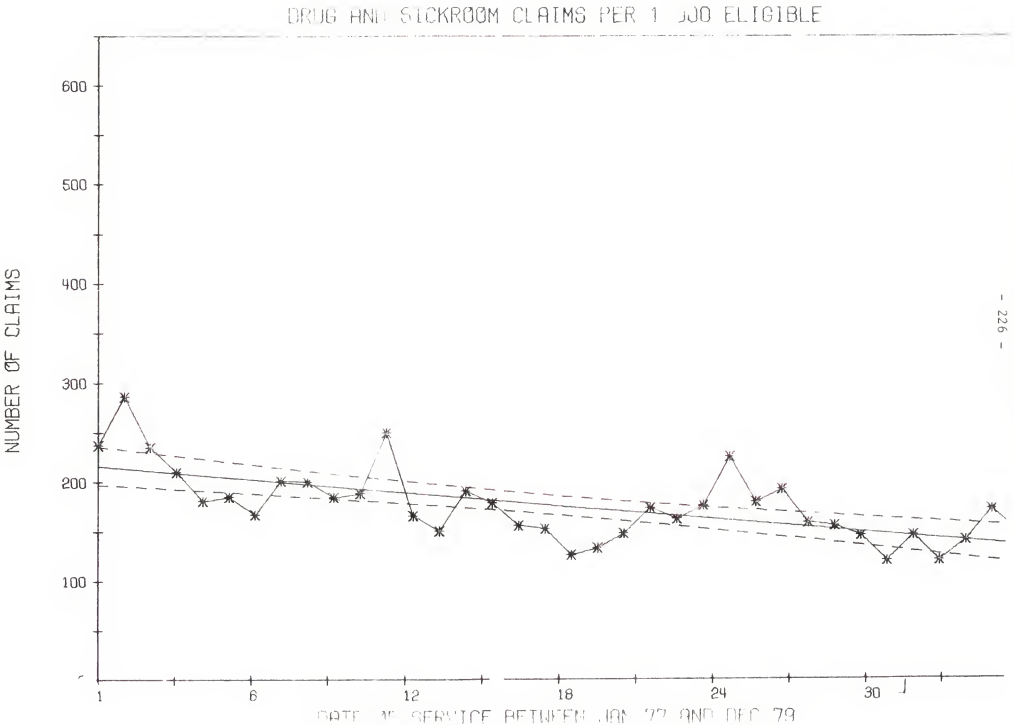
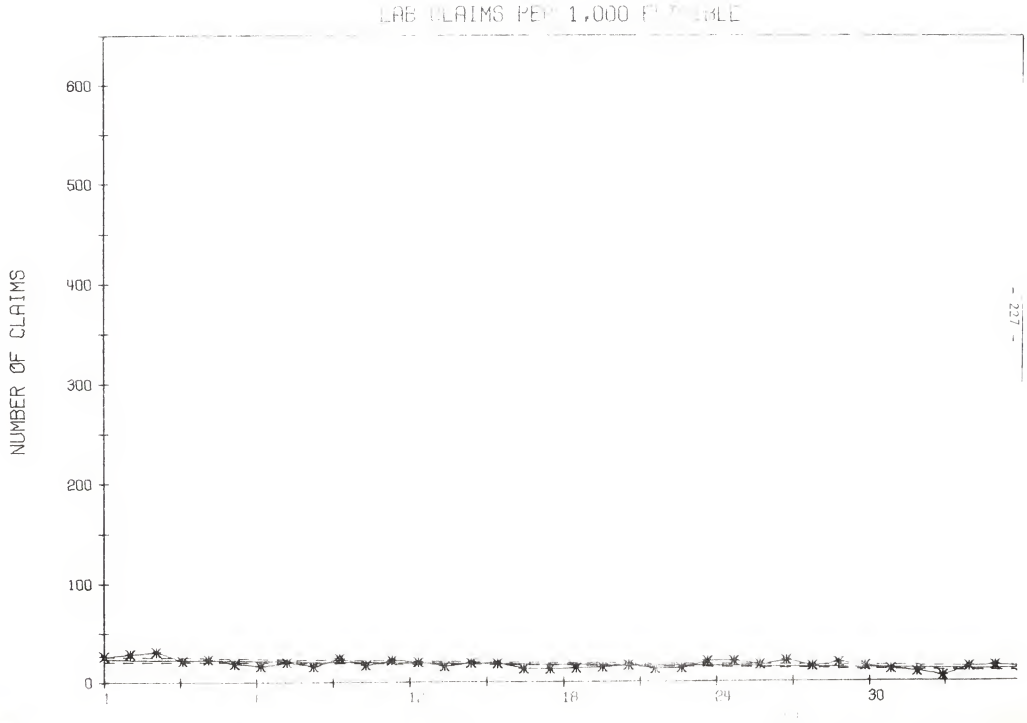
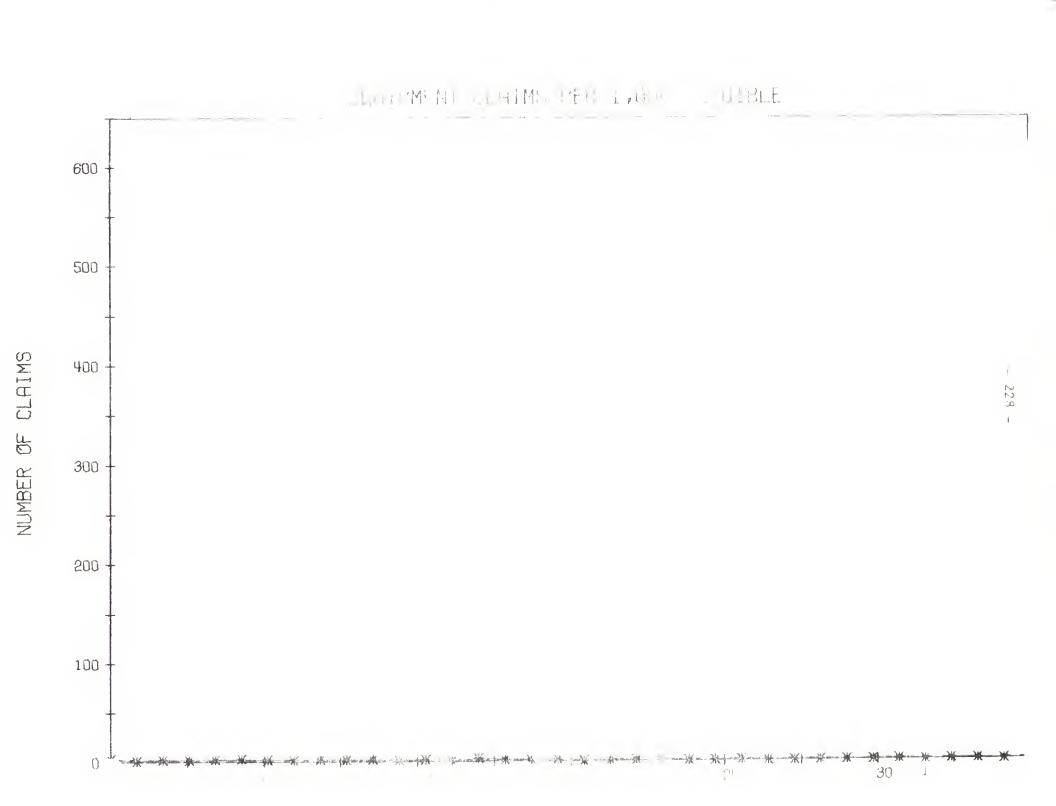
500
400
300
200
100
0
1
18
24
30

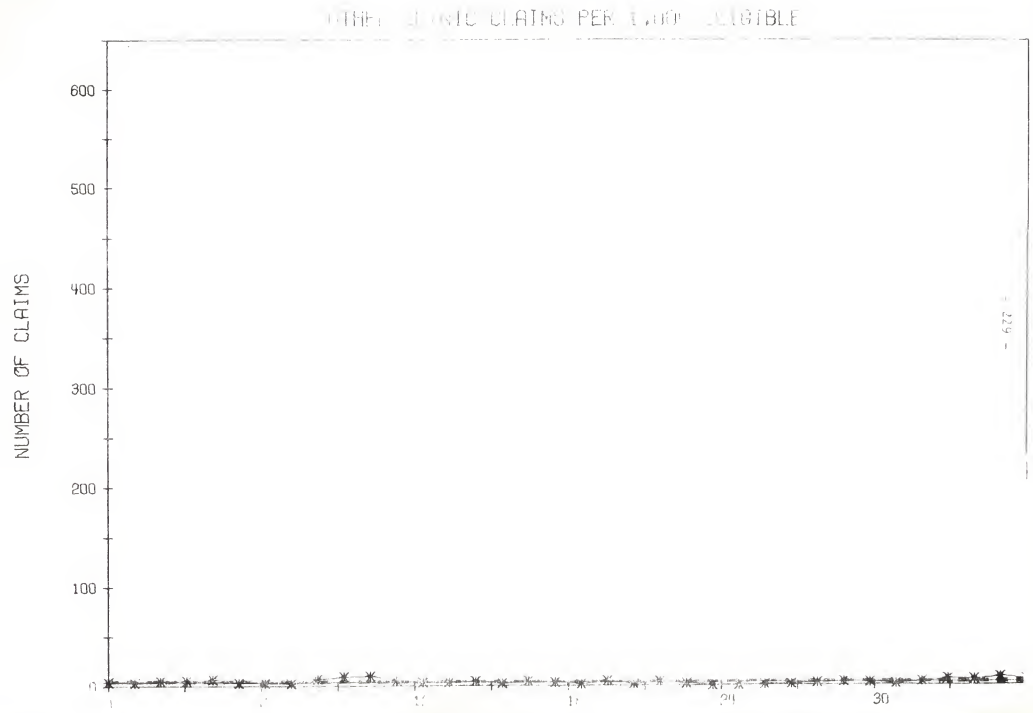

HOSPITALIZATIONS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
600
500
400
300
200
100
0
1
8
16
24
30

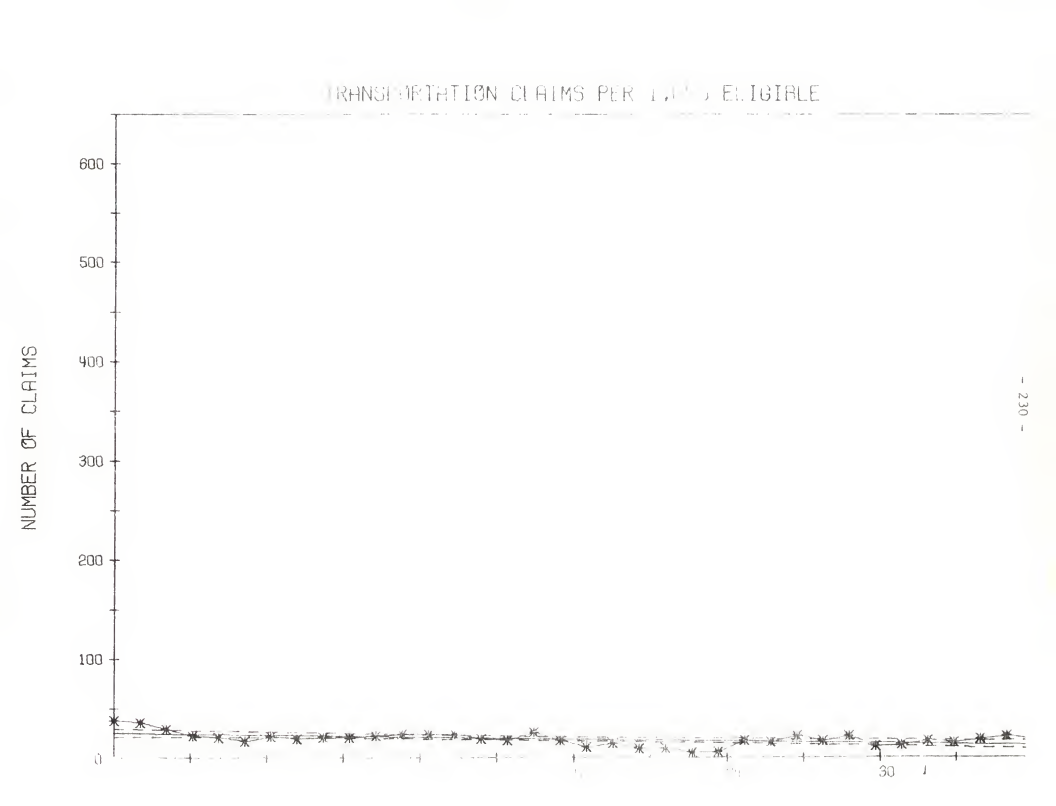

OPTICAL CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
600
500
400
300
200
100
0
1
6
12
18
24
30


DRUG AND SICKROOM CLAIMS PER 1 000 ELIGIBLE
NUMBER OF CLAIMS
600
500
400
300
200
100
1
6
12
18
24
30
DATE OF SERVICE BETWEEN JAN 72 AND DEC 79

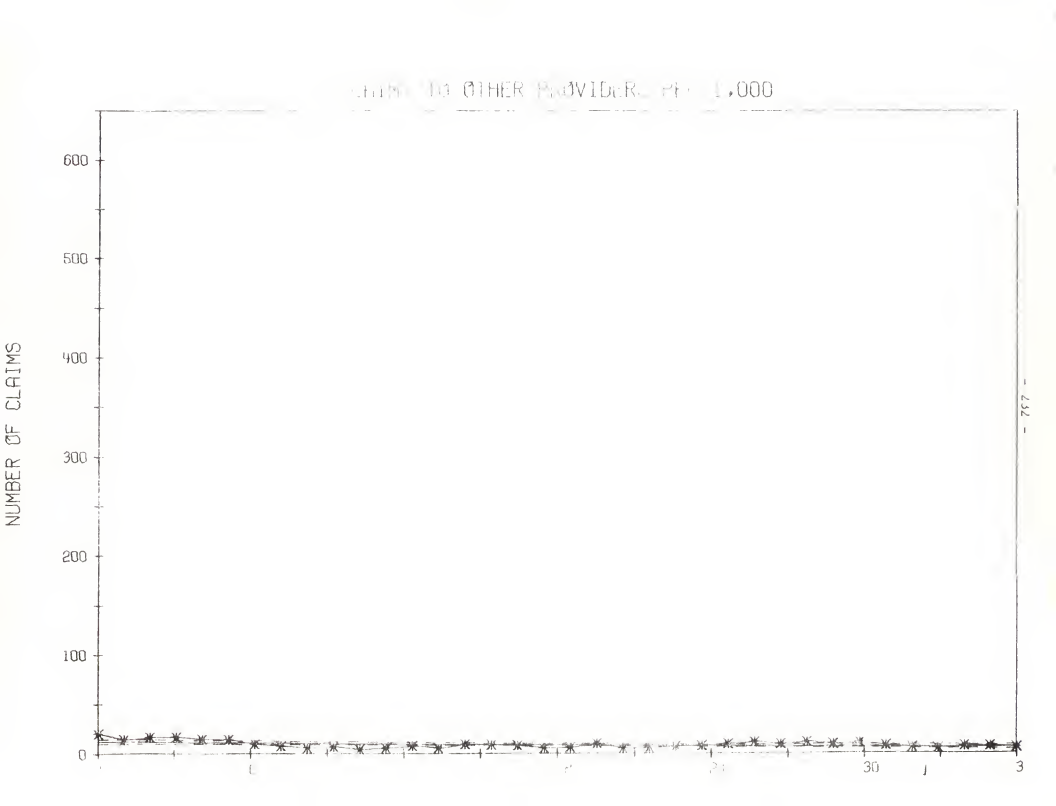

LAB CLAIMS PER 1,000 E
NUMBER OF CLAIMS
600
500
400
300
200
100
0
1
18
24
30

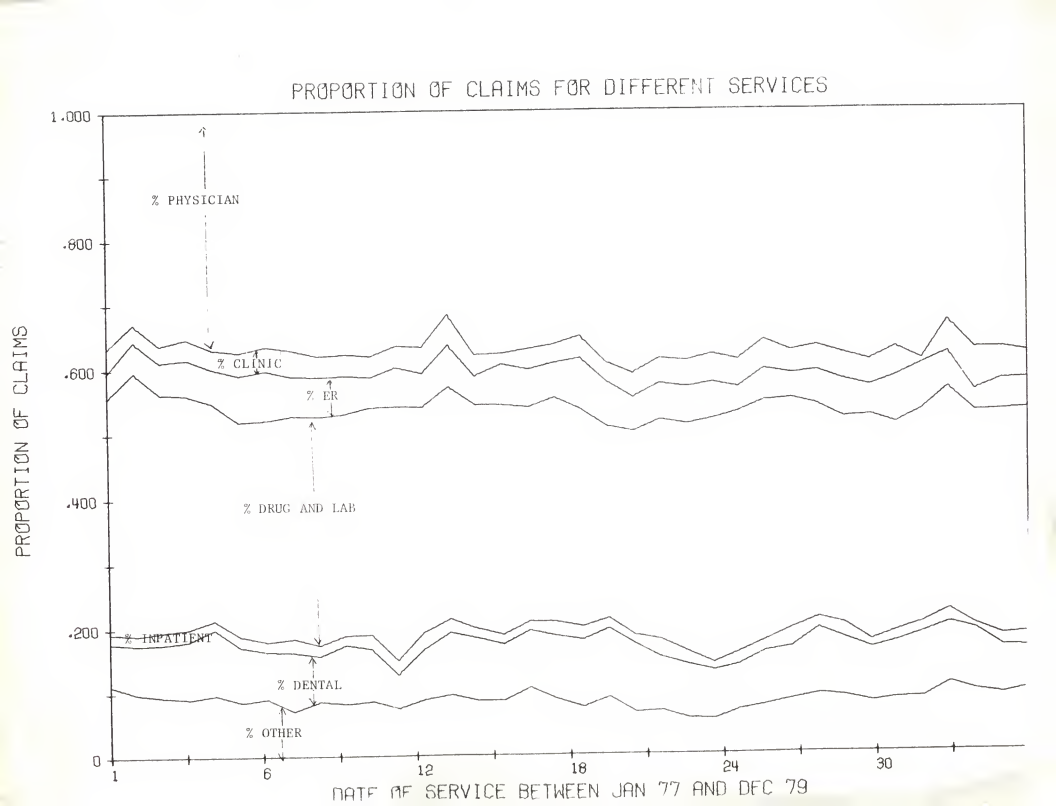

NUMBER OF CLAIMS
600
500
400
300
200
100
0
30


NUMBER OF CLAIMS
600
500
400
300
200
100
0
30


TRANSPORTATION CLAIMS PER 1,000 ELIGIBLE
NUMBER OF CLAIMS
600
500
400
300
200
100
0
30


IN TUITION CLAIMS PER 1,00 ELIGIBLE
NUMBER OF CLAIMS
600
500
400
300
200
100
0
30


NUMBER OF CLAIMS
600
500
400
300
200
100
0
30


PROPORTION OF CLAIMS FOR DIFFERENT SERVICES
1.000
.800
.600
.400
.200
0
PROPORTION OF CLAIMS
% PHYSICIAN
% CLINIC
% ER
% DRUG AND LAB
% INPATIENT
% DENTAL
% OTHER
1
6
12
18
24
30
DATE OF SERVICE BETWEEN JAN 77 AND DEC 79